ORDER NO. VSD9903M902B
D25

Service Manual

DVCPRO 50

Digital Video Cassette Player

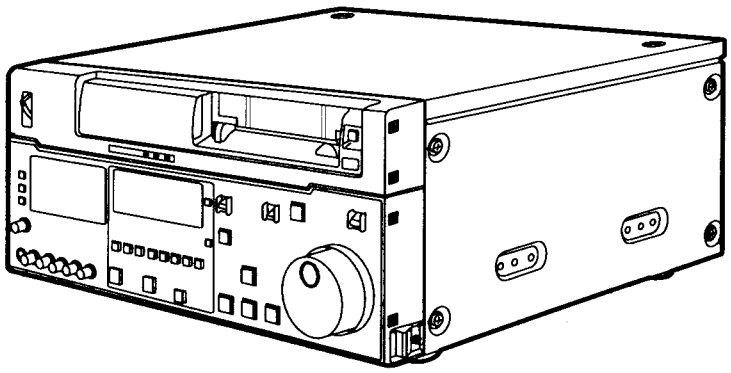
AJ-D940P/E

Vol. 2

Sec. 7 ***Service Information***

Sec. 8 ***Electrical Adjustments***

Sec. 9 ***Block Diagrams***



Please refer to the Service Manual Volume 1 (order No. VSD9903M902A) for Operating Instructions, Disassembly & Maintenance, Mechanism Adjustments, Schematic Diagrams, Circuit Board Diagrams and Exploded Views & Replacement Parts Lists.

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⚠WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advice non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service manual by anyone else could result in serious injury or death.

INTRODUCTION

This service manual contains technical information which allow service personnel to understand and service the DVCPRO Studio VTR AJ-D940.

Specifications

AJ-D940P

GENERAL

Power supply voltage	AC 120V, 50 – 60 Hz
Power consumption	215W (full operation)

Operating ambient temperature	41°F to 104°F (5°C to 40°C)
Operating ambient humidity	10% to 90% (no condensation)
Weight	37.84 lb (17.2 kg)
Dimensions	16-3/4" (W) × 6-15/16" (H) × 16-3/8" (D) (424 × 175 × 415 mm) (excluding unit's feet, jacks and jog dial)
Playback format	DVCPRO50/DVCPRO formats
Playback video signals	525i/625i selectable
Playback audio signals	DVCPRO50: 48 kHz, 16 bits, 4 channels DVCPRO: 48 kHz, 16 bits, 2 channels
Playback tracks	Digital/video/audio tracks: Helical tracks Time codes are recorded in sub-code area. Cue track: 1 track Control track: 1 track
Tape speed	67.640 mm/sec (525) 67.708 mm/sec (625)
Playback time	92 min. (using AJ-5P92LP)
Tape used	Metal tape
FF/REW time	Less than 3 min. (using AJ-5P92LP)
Search speed	±32× normal speed (color)
Digital slow	Plus direction: +1× for DVCPRO50 +2× for DVCPRO Minus direction: –1× for DVCPRO50 –2× for DVCPRO
Editing accuracy	±0 frame (using time code)
Tape timer accuracy	±1 frame (using continuous CTL signal)
Servo lock time	Less than 0.5 sec (color framing/standby ON)

VIDEO

Sampling frequencies	DVCPRO50 525i/625i: Y; 13.5 MHz/P_B, P_R; 6.75 MHz
Quantizing	8 bits
Video compression method	DCT + adaptive quantizing + variable length code
Video compression rate	DVCPRO50: 1/3.3 DVCPRO: 1/5
Error correction	Reed-Solomon product code
Video recording bit rate	DVCPRO50: 50 Mbps DVCPRO: 25 Mbps

Analog Component Output Video

Video bandwidth (see Note 1)	525i: Y; 30 Hz to 5.5 MHz (±0.5 dB), 5.75 MHz (–2.0 dB) P_B, P_R; 30 Hz to 2.5 MHz (±0.5 dB), 2.75 MHz (–2.0 dB) 625i: Y; 25 Hz to 5.5 MHz (±0.5 dB), 5.75 MHz (–2.0 dB) P_B, P_R; 25 Hz to 2.5 MHz (±0.5 dB), 2.75 MHz (–2.0 dB) (Note 1: When playing back a tape recorded with digital input signals)
S/N ratio	Better than 60 dB
K factor (2T)	Less than 1%

Specifications

AJ-D940P

Video Input Connectors

Reference input	Analog composite, BNC × 2, loop-through, 75Ω ON/OFF selectable

Video Output Connectors

Analog component output	BNC × 3 (Y, P_B, P_R) Y: 1.0 Vp-p, 75Ω P_B, P_R: 0.525/0.757 Vp-p switchable, 75Ω (75% color bar, 0% setup)
Analog composite output	BNC × 3, video 1, video 2, video 3 (superimpose ON/OFF)
Serial digital component output	BNC × 3, complies with the SMPTE259M-C standard SDI 1, SDI 2, SDI 3 (superimposed ON/OFF)
SDTI output (option)	BNC × 1, complies with the SMPTE305M standard (use of SDI 1 output connector shared)

Video Signal Adjustment Ranges

Video output gain	±3 dB
Video output chroma gain	±3 dB
Video output chroma phase	±30°
Video output setup	±14 IRE
Video output sync phase	±15 µsec
Video output SC phase	±180°

AUDIO

Digital Audio

Sampling frequency	48 kHz (synchronized with video)
Quantizing	16 bits
Frequency response	20 Hz to 20 kHz ±1.0 dB (at reference level)
Dynamic range	Better than 90 dB (1 kHz, emphasis OFF, A weighted)
Distortion	Less than 0.05% (1 kHz, emphasis OFF, reference level)
Crosstalk	Less than –80 dB (1 kHz, between 2 channels)
Wow & flutter	Below measurable limit
Head room	525i: 20 dB 625i: 18 dB
De-emphasis	T1 = 50 µsec, T2 = 15 µsec (selected automatically)

Cue Track

Frequency response	300 Hz to 6 kHz ±3 dB

Audio Output Connectors

Analog output (CH1/CH2/CH3/CH4)	XLR × 4, low impedance, +4/0/–20 dBu, selectable using menu item setting
Digital output (CH1/CH2, CH3/CH4)	XLR × 2, AES/EBU format
Serial digital output	Complies with SMPTE259M-C/272M standard (BNC, 75Ω)
Cue track output	XLR × 1, low impedance, +4/0/–20 dBu, selectable using menu item setting
Monitor output	XLR × 2, low impedance, +4/0/–20 dBu, selectable using menu item setting
Headphones output	1/4" phone, 8Ω, variable level

Other Input/Output Signal Connectors

Time code output	XLR ×1, 2.0 Vp-p, low impedance
RS-422A input	D-sub 9-pin, RS-422A interface
RS-422A output	D-sub 9-pin, RS-422A interface
RS-232C	D-sub 25-pin, RS-232C interface
Parallel input/output	D-sub 25-pin
Encoder remote	D-sub 15-pin

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

IMPORTANT
"Unauthorized recording of copyrighted television programs, video tapes and other materials may infringe the right of copyright owners and be contrary to copyright laws."

AJ-D940P

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK,
DO NOT REMOVE COVER (OR BACK).
NO USER-SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

CAUTION:
To reduce the risk of fire or shock hazard and annoying interference, use the recommended accessories only.

WARNING:
TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.

CAUTION:
TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, REFER MOUNTING OF THE OPTIONAL BOARD TO AUTHORIZED SERVICE PERSONNEL.

FCC Note:
This device complies with Part 15 of the FCC Rules. To assure continued compliance follow the attached installation instructions and do not make any unauthorized modifications.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

☐ is the safety information.

- Do not insert fingers or any objects into the video cassette holder.
- Avoid operating or leaving the unit near strong magnetic fields. Be especially careful of large audio speakers.
- Avoid operating or storing the unit in an excessively hot, cold, or damp environment as this may result in damage both to the unit and to the tape.
- Do not spray any cleaner or wax directly on the unit.
- If the unit is not going to be used for a length of time, protect it from dirt and dust.
- Do not leave a cassette in the unit when not in use.
- Do not block the ventilation slots of the unit.
- Use this unit horizontally and do not place anything on the top panel.
- Do not attempt to disassemble the unit. There are no user serviceable parts inside.
- If any liquid spills inside the recorder, have the unit examined for possible damage.
- Refer any needed servicing to authorized service personnel.

IMPORTANT
"Unauthorized recording of copyrighted television programmes, video tapes and other materials may infringe the right of copyright owners and be contrary to copyright laws."

AJ-D940E

■ **THIS APPARATUS MUST BE EARTHED**
To ensure safe operation the three-pin plug must be inserted only into a standard three-pin power point which is effectively earthed through the normal house-hold wiring.
Extension cords used with the equipment must be three-core and be correctly wired to provide connection to earth. Wrongly wired extension cords are a major cause of fatalities.
The fact that the equipment operates satisfactorily does not imply that the power point is earthed and that the installation is completely safe. For your safety, if in any doubt about the effective earthing of the power point, consult a qualified electrician.

■ **DO NOT REMOVE PANEL COVER BY UN-SCREWING**
To reduce the risk of electric shock, do not remove cover. No user serviceable parts inside. And do not insert fingers or any other objects into the video cassette holder.

CAUTION:
Do not install or place this unit in a bookcase, built in cabinet or in another confined space in order to keep well ventilated condition. Ensure that curtains and any other materials do not obstruct the ventilation condition to prevent risk of electric shock or fire hazard due to overheating.

WARNING:
TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.

CAUTION:
TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, AND ANNOYING INTERFERENCE, USE THE RECOMMENDED ACCESSOIRES ONLY.

CAUTION:
TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, REFER MOUNTING OF THE OPTIONAL BOARD TO QUALIFIED SERVICE PERSONNEL.

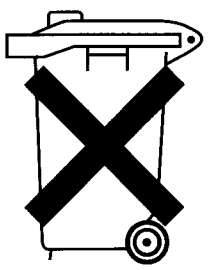
Operating precaution
Operation near any appliance which generates strong magnetic fields may give rise to noise in the video and audio singals. If this should be the case, deal with the situation by, for instance, moving the source of the magnetic fields away from the unit before operation.

☐ is the safety information.

Attention/Attentie

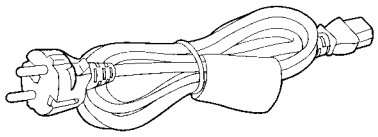
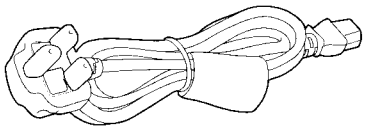
- This apparatus contains a lithium battery for memory back-up.
- For the removal of the battery at the moment of the disposal at the end of the service life please consult your dealer.
- Do not throw away the battery. Instead, hand it in as hazardous waste.

- Dit apparaat bevat een lithiumbatterij voor memory back-up.
- Raadpleeg uw leverancier over de verwijdering van de batterij op het moment dat u het apparaat bij einde levensduur afdankt.
- Gooi de batterij niet weg, maar lever hem in als KCA.



Caution for AC Mains Lead

FOR YOUR SAFETY PLEASE READ THE FOLLOWING TEXT CAREFULLY.
This product is equipped with 2 types of AC mains cable. One is for continental Europe, etc. and the other one is only for U.K.
Appropriate mains cable must be used in each local area, since the other type of mains cable is not suitable.

FOR CONTINENTAL EUROPE, ETC. Not to be used in the U.K.	**FOR U.K. ONLY** If the plug supplied is not suitable for your socket outlet, it should be cut off and appropriate one fitted.
	

FOR U.K. ONLY

This appliance is supplied with a moulded three pin mains plug for your safety and convenience.
A 13 amp fuse is fitted in this plug.
Should the fuse need to be replaced please ensure that the replacement fuse has a rating of 13 amps and that it is approved by ASTA or BSI to BS1362.
Check for the ASTA mark ⟨ASTA⟩ or the BSI mark ♡ on the body of the fuse.

If the plug contains a removable fuse cover you must ensure that it is refitted when the fuse is replaced.
If you lose the fuse cover the plug must not be used until a replacement cover is obtained.
A replacement fuse cover can be purchased from your local Panasonic Dealer.

IF THE FITTED MOULDED PLUG IS UNSUITABLE FOR THE SOCKET OUTLET IN YOUR HOME THEN THE FUSE SHOULD BE REMOVED AND THE PLUG CUT OFF AND DISPOSED OF SAFELY. THERE IS A DANGER OF SEVERE ELECTRICAL SHOCK IF THE CUT OFF PLUG IS INSERTED INTO ANY 13 AMP SOCKET.

If a new plug is to be fitted please observe the wiring code as shown below.
If in any doubt please consult a qualified electrician.
WARNING: THIS APPLIANCE MUST BE EARTHED.
IMPORTANT: The wires in this mains lead are coloured in accordance with the following code:

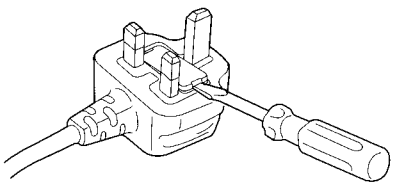
Green-and-Yellow:	Earth
Blue:	Neutral
Brown:	Live

As the colours of the wires in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

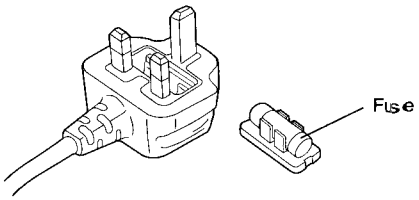
- The wire which is coloured GREEN-AND-YELLOW must be connected to the terminal in the plug which is marked with the letter E or by the Earth symbol ⏚ or coloured GREEN or GREEN-AND-YELLOW.
- The wire which is coloured BLUE must be connected to the terminal in the plug which is marked with the letter N or coloured BLACK.
- The wire which is coloured BROWN must be connected to the terminal in the plug which is marked with the letter L or coloured RED.

How to replace the fuse

1. Open the fuse compartment with a screwdriver.



2. Replace the fuse.



Specifications

AJ-D940E

GENERAL

Power supply voltage	AC 220 – 240V, 50 – 60 Hz
Power consumption	215W (full operation)

Operating ambient temperature	5°C to 40°C
Operating ambient humidity	10% to 90% (no condensation)
Weight	17.4 kg
Dimensions	424 (W) × 175 (H) × 415 (D) mm (excluding unit's feet, jacks and jog dial)
Playback format	DVCPRO50/DVCPRO formats
Playback video signals	625i/525i selectable
Playback audio signals	DVCPRO50: 48 kHz, 16 bits, 4 channels DVCPRO: 48 kHz, 16 bits, 2 channels
Playback tracks	Digital/video/audio tracks: Helical tracks Time codes are recorded in sub-code area. Cue track: 1 track Control track: 1 track
Tape speed	67.708 mm/sec (625i) 67.640 mm/sec (525i)
Playback time	92 min. (using AJ-5P92LP)
Tape used	Metal tape
FF/REW time	Less than 3 min. (using AJ-5P92LP)
Search speed	±32× normal speed (colour)
Digital slow	Plus direction: +1× for DVCPRO50 +2× for DVCPRO Minus direction: –1× for DVCPRO50 –2× for DVCPRO
Editing accuracy	±0 frame (using time code)
Tape timer accuracy	±1 frame (using continuous CTL signal)
Servo lock time	Less than 0.5 sec (colour framing/standby ON)

VIDEO

Sampling frequencies	DVCPRO50 625i/525i: Y; 13.5 MHz/P_B, P_R; 6.75 MHz
Quantizing	8 bits
Video compression method	DCT + adaptable quantizing + variable length code
Video compression rate	DVCPRO50: 1/3.3 DVCPRO: 1/5
Error correction	Reed-Solomon product code
Video recording bit rate	DVCPRO50: 50 Mbps DVCPRO: 25 Mbps

Analogue Component Output Video

Video bandwidth (see Note 1)	625i: Y; 25 Hz to 5.5 MHz (±0.5 dB), 5.75 MHz (–2.0 dB) P_B, P_R; 25 Hz to 2.5 MHz (±0.5 dB), 2.75 MHz (–2.0 dB) 525i: Y; 30 Hz to 5.5 MHz (±0.5 dB), 5.75 MHz (–2.0 dB) P_B, P_R; 30 Hz to 2.5 MHz (±0.5 dB), 2.75 MHz (–2.0 dB) (Note 1: When playing back a tape recorded with digital input signals)
S/N ratio	Better than 60 dB
K factor (2T)	Less than 1%

Video Input Connectors

Reference input	Analogue composite, BNC × 2, loop through, 75Ω ON/OFF selectable

Specifications

AJ-D940E

Video Output Connectors

Analogue component output	BNC × 3 (Y, P_B, P_R) Y: 1.0 Vp-p, 75Ω P_B, P_R: 0.7 Vp-p, 75Ω (100% colour bar)
Analogue composite output	BNC × 3, video 1, video 2, video 3 (superimpose ON/OFF)
Serial digital component output	BNC × 3, complies with the EBU Tech. 3267-E standard SDI 1, SDI 2, SDI 3 (superimposed ON/OFF)
SDTI output (option)	BNC × 1, complies with the SMPTE 305M standard (use of SDI 1 output connector shared)

Video Signal Adjustment Ranges

Video output gain	±3 dB
Video output chroma gain	±3 dB
Video output chroma phase	±30°
Video output setup	±100 mV
Video output sync phase	±15 µsec
Video output SC phase	±180°

AUDIO

Digital Audio

Sampling frequency	48 kHz (synchronized with video)
Quantizing	16 bits
Frequency response	20 Hz to 20 kHz ±1.0 dB (at reference level)
Dynamic range	Better than 90 dB (1 kHz, emphasis OFF, "A" weighted)
Distortion	Less than 0.05% (1 kHz, emphasis OFF, reference level)
Crosstalk	Less than –80 dB (1 kHz, between 2 channels)
Wow & flutter	Below measurable limit
Head room	625i: 18 dB 525i: 20 dB
De-emphasis	T1 = 50 µsec, T2 = 15 µsec (selected automatically)

Cue Track

Frequency response	300 Hz to 6 kHz ±3 dB

Audio Output Connectors

Analogue output (CH1/CH2/CH3/CH4)	XLR × 4, low impedance, +4/0/–20 dBu, selectable using menu item setting*
Digital output (CH1/CH2, CH3/CH4)	XLR × 2, AES/EBU format
Serial digital output	Complies with EBU Tech. 3267-E standard (BNC, 75Ω)
Cue track output	XLR × 1, low impedance, +4/0/–20 dBu, selectable using menu item setting*
Monitor output	XLR × 2, low impedance, +4/0/–20 dBu, selectable using menu item setting*
Headphones output	6.35 mm, 8Ω, variable level

Other Input/Output Signal Connectors

Time code output	XLR × 1, 2.0 Vp-p, low impedance
RS-422A input	D-sub 9-pin, RS-422A interface
RS-422A output	D-sub 9-pin, RS-422A interface
RS-232C	D-sub 25-pin, RS-232C interface
Parallel input/output	D-sub 25-pin
Encoder remote	D-sub 15-pin

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

* EG model is fixed to –3 dBu.

SAFETY PRECAUTIONS

GENERAL GUIDELINES

1. When servicing, observe the original lead dress. If a short circuit is found, replace all parts which have been overheated or damaged by the short circuit.
2. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers shields are properly installed.
3. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

LEAKAGE CURRENT COLD CHECK

1. Unplug the AC cord and connect a jumper between the two prongs on the plug.
2. Measure the resistance value, with an ohmmeter, between the jumpered AC plug and each exposed metallic cabinet part on the equipment such as screwheads, connectors, control shafts, etc. When the exposed metallic part has a return path to the chassis, the reading should be between 1MΩ and 5.2MΩ.
   When the exposed metal does not have a return path to the chassis, the reading must be ∞.

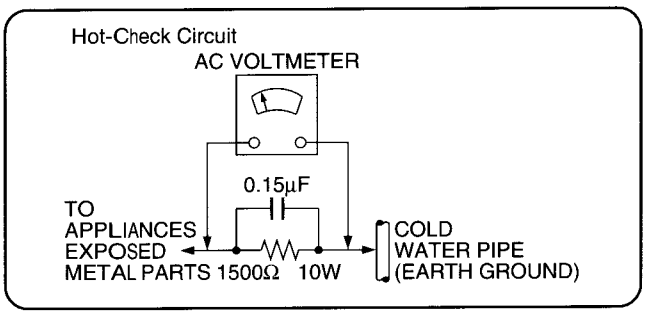


Figure 1

LEAKAGE CURRENT HOT CHECK (See Figure 1.)

1. Plug the AC cord directly into the AC outlet.
   Do not use an isolation transformer for this check.
2. Connect a 1.5kΩ, 10 W resistor, in parallel with a 0.15μF capacitor, between each exposed metallic part on the set and a good earth ground such as a water pipe, as shown in Figure 1.
3. Use an AC voltmeter, with 1000 ohms/volt or more sensitivity, to measure the potential across the resistor.
4. Check each exposed metallic part, and measure the voltage at each point.
5. Reverse the AC plug in the AC outlet and repeat each of the above measurements.
6. The potential at any point should not exceed 0.75 volts RMS. A leakage current tester (Simpson Model 229 equivalent) may be used to make the hot checks, leakage current must not exceed 1/2 milliamp. In case a measurement is outside of the limits specified, there is a possibility of a shock hazard, and the equipment should be repaired and rechecked before it is returned to the customer.

ELECTROSTATICALLY SENSITIVE (ES) DEVICES

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground.
   Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as alminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static solder removal device classified as "anti-static" can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (most replacement ES devices are packaged with leads electrically shorted together by conductive foam, alminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.
   CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise hamless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device).

MEMO

SECTION 7

SEVICE INFORMATION

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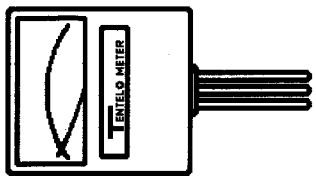
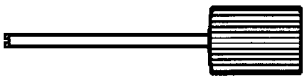
7-1. SERVICING FIXTURES & TOOLS

FIG	PART NUMBER	FIXTURES & TOOLS	REMARKS
1	VFK1145	Back Tension Meter (T2-M30-P)	
2	VFK1149	Post Driver	
3	VFK71	Dial Torque Gauge (150g)	
4	VFK1191	Dial Torque Gauge (45g)	
5	VFK1152	Dial Torque Gauge Adapter	
6	VFK0357	Eccentric Screwdriver (1.5mm)	
7	VFK1154	Post Height Fixture	
8	VFK1153	Mech. Neutral Plate (Post)	
9	VFK1155	Neutral Position Plate for Rev. (Silver)	
10	VFK1156	Neutral Position Plate for P.B. (Black)	
11	VFK1208	Neutral Position Plate (Black with hole)	
12	VFK1150	Nut Driver (5.5mm)	
13	VFK1151	Nut Driver (2.5mm)	
14	VFK1188	Dial Tension Gauge (30g)	
15	VFK0948A	Check light	
16	VFK0749	Froiral Grease (for plastics)	
17	MOR265	Morlytone Grease (for metal)	
18	VFK1146	Philips Driver (Fine) (00-75)	
19	VFK1147	Philips Driver (Fine) (00-100)	
20	VFK1148	Hex. Driver (1.5mm)	
21	VFK1178	Hex. Driver (0.89mm)	
22	VFK1179	Hex. Driver (0.71mm)	
23	VFK1190	Hex. Wrench (1.5mm)	
24	VFK1209	Torque Driver (0.4-3kgf·cm)	
25	VFK0912	Post Axis Driver (1.5mm)	or VFK1375
26	VFK1300	A/D Board (DAQ-12 Quatech)	
27	VFM3580KM	DVCPRO Alignment Tape (No.1) for NTSC	or VFM3580KL
28	VFM3581KM	DVCPRO Alignment Tape (No.2) for NTSC	or VFM3581KL
29	VFM3582KM	DVCPRO Alignment Tape (No.3) for NTSC	or VFM3582KL
30	VFM3380KM	DVCPRO 50 Alignment Tape for NTSC	
31	VFM3010EDS	DV Alignment Tape (DV Color Bar) for NTSC	
32	VFM3680KM	DVCPRO Alignment Tape (No.1) for PAL	or VFM3680KL
33	VFM3681KM	DVCPRO Alignment Tape (No.2) for PAL	or VFM3681KL
34	VFM3682KM	DVCPRO Alignment Tape (No.3) for PAL	or VFM3682KL
35	VFM3480KM	DVCPRO 50 Alignment Tape for PAL	
36	VFM3110EDS	DV Alignment Tape (DV Color Bar) for PAL	
37	VFM3000EDS	DV Alignment Tape (DV LISTA)	
38	AJ-CL12MP	Cleaning Tape	SALES Route
39	VFK1481	LISTA Software	
40	VFK1186	LISTA Cable	
41	VFK1192	F Extension Board	
42	VFK1383	F Extension Board (2)	for F4、F5
43	VFK1193	H Extension Board	
44	VFK1194	Extension Board	
45	VFK1369	Tape Beg./ End Detection Cassette	
46	VFK1158	B.E.R. Counter	
47	VFK1228	B.E.R. Counter Cable	
48	VZZ0095	Cleaning Close	
49	VFK0906	High Quality Oil	

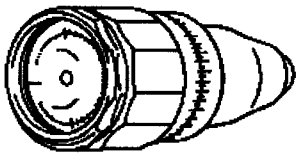
1 VFK1145
Back Tension Meter



2 VFK1149
Post Driver

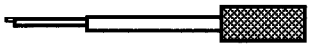


3 VFK71 (150g)
4 VFK1191 (45g)
Dial Torque Gauge



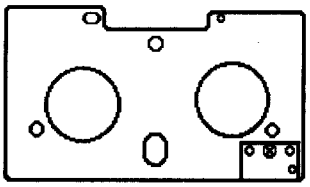
5 VFK1152
Dial Torque Gauge Adapter

6 VFK0357 (1.5mm)
Eccentric Screwdriver



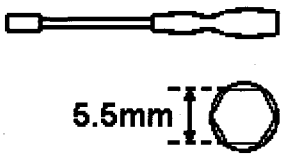
7 VFK1154
Post Height Fixture

8 VFK1153
Mech Neutral Plate (Post)

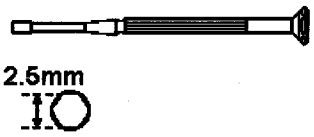


9 VFK1155 (Silver)
10 VFK1156 (Black)
11 VFK1208 (Black with hole)
Neutral Position Tool

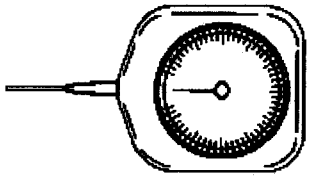
12 VFK1150
Nut Driver (5.5mm)



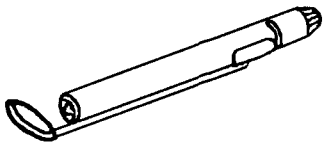
13 VFK1151
Nut Driver (2.5mm)



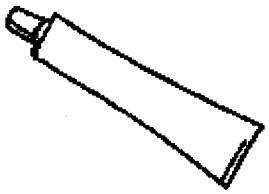
14 VFK1188 (30g)
Dial Tension Gauge



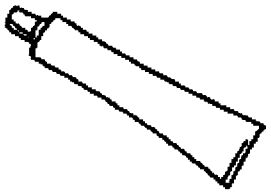
15 VFK0948A
Check Light



16 VFK0749
Froiral Grease (White) (for Plastic part)

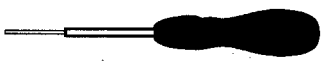


17 MOR265
Morlytone Grease (Black)(for metal part)



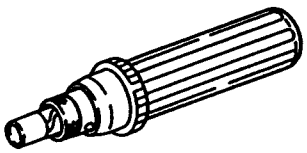
18 VFK1146 (00X75)
19 VFK1147 (0X100)
Philips Driver

20 VFK1148 (1.5mm)
21 VFK1178 (0.89mm)
22 VFK1179 (0.71mm)
Hex. Driver

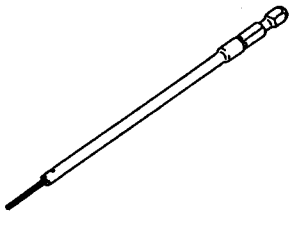


23 VFK1190 (1.5mm)
Hex. Wrench

24 VFK1209
Torque Driver (0.4-3kgf·cm)

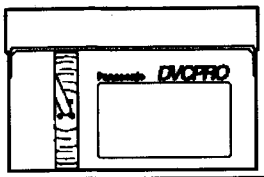


25 VFK0912 or 1375
Post Axis Driver (1.5mm)

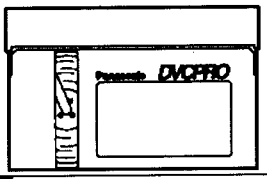


26 VFK1300
A/D Converter Board (Quatech DAQ-12)

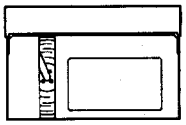
27 **VFM3580KM or L**
28 **VFM3581KM or L**
29 **VFM3582KM or L**
DVCPRO Alignment Tape (NTSC)



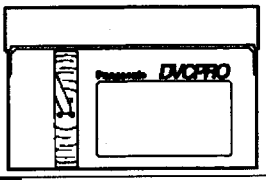
30 **VFM3380KM**
DVCPRO 50 Alignment Tape (NTSC)



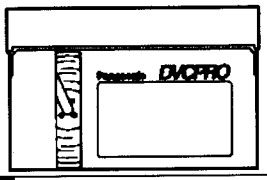
31 **VFM3010EDS**
DV Alignment Tape (DV Color Bar) (NTSC)



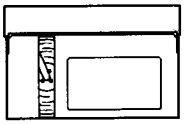
32 **VFM3680KM or L**
33 **VFM3681KM or L**
34 **VFM3682KM or L**
DVCPRO Alignment Tape (PAL)



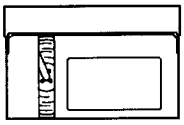
35 **VFM3480KM**
DVCPRO 50 Alignment Tape (PAL)



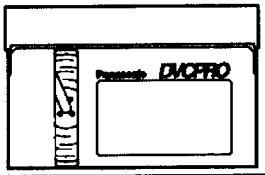
36 **VFM3110EDS**
DV Alignment Tape (DV Color Bar) (PAL)



37 **VFM3000EDS**
DV Alignment Tape (DV LISTA)

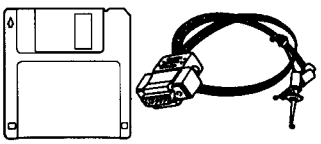


38 **AJ-CL12MP**
Cleaning Tape



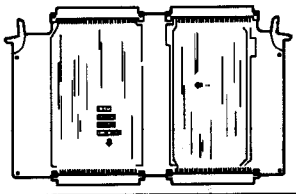
39 **VFK1481**
LISTA Software

40 **VFK1186**
LISTA Cable

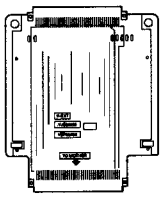


41 **VFK1192**
F Extension Board

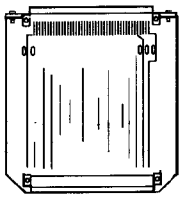
42 **VFK1383**
F Extension Board (2)



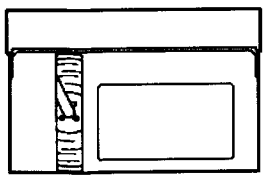
43 **VFK1193**
H Extension Board



44 **VFK1194**
Extension Board

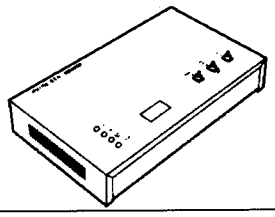


45 **VFK1369**
Tape Beg./End. Detection Cassette

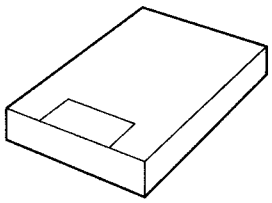


46 **VFK1158**
B.E.R. Counter

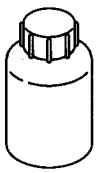
47 **VFK1228**
B.E.R. Counter Cable



48 **VZZ0095**
Cleaning Close



49 **VFK0906**
High Quality Oil



7-2. ALIGNMENT TAPE

7-2-1. VFM3580KM (NTSC)

TIME	VIDEO		PCM AUDIO		CUE	
(min.)	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00	Color Bar SMPTE(75%)	Composite Video Level Confirmation	1KHz –20dB	Audio Level Confirmation	1KHz 0VU	CUE Level Confirmation
7:00	Color Bar (100%)	Component Video Level Confirmation				
14:00	H Sweep	Frequency Response			6KHz 0VU	A/C Head Azimuth
18:00	Bowtie(500K)	Y/C Timing				
22:00	Pulse & Bar	Y/C Timing			300, 500, 1K 2K, 4K, 6KHz	Frequency Response
26:00	Area Markers				-----	-----

7-2-2. VFM3581KM (NTSC)

TIME	VIDEO		PCM AUDIO		CUE	
(min.)	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00	ITI Pattern	Linearity Adjustment	-----	-----	-----	-----

7-2-3. VFM3582KM (NTSC)

TIME	VIDEO		PCM AUDIO		CUE	
(min.)	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00	Color Bar (75%) w/ REF	X-Value Adjustment	-----	-----	6KHz 10VU	X-Value Adjustment

7-2-4. VFM3380KM (NTSC)

DVCPRO 50 Alignment Tape

7-2-5. VFM3680KM (PAL)

TIME	VIDEO		PCM AUDIO		CUE	
(min.)	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00	Color Bar 100%	Video Level Confirmation	1KHz -18dBu	Audio level Confirmation	1KHz Reference level	CUE Level Confirmation
10:00	H Sweep	Frequency Response				
14:00	Area Markers				6KHz Reference level	A/C Head Azimuth
18:00	Bowtie (500K)	Y/C Timing				
22:00	Pluse & Bar	Y/C Timing			1KHz 300KHz~6KHz	Frequency Response
26:00 30:00	Multi Pulse	Y/C Timing				

7-2-6. VFM3681KM (PAL)

TIME	VIDEO		PCM AUDIO		CUE	
(min.)	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00	ITI Pattern	Linearity Adjustment	-----	-----	-----	-----

7-2-7. VFM3682KM (PAL)

TIME	VIDEO		PCM AUDIO		CUE	
(min.)	Signal	Purpose	Signal	Purpose	Signal	Purpose
0:00	Color Bar (75%) w/ REF	X-Value Adjustment	-----	-----	6KHz 10VU	X-Value Adjustment

7-2-8. VFM3480KM (PAL)

DVCPRO 50 Alignment Tape

7-3. RECOMMENDED TEST & SERVICE EQUIPMENT

NTSC

MODEL NO. (Example)	NAME	REMARK
TSG130A (op. 04)	Analog Component Signal Generator	TEKTRONIX
1760 (op. SC) or 1780R	SCH Meter	TEKTRONIX
	Waveform Monitor	
	Vector Scope	
	400MHz Oscilloscope	
	Digital Volt Meter	
	Frequency Counter	
	VTVM	
	Audio Analyzer	

PAL

MODEL NO. (Example)	NAME	REMARK
TSG131A (op. 04)	Analog Component Signal Generator	TEKTRONIX
2467B	400MHz Oscilloscope	TEKTRONIX
1751 (op. SC) or 1781R	SCH Meter	TEKTRONIX
	Digital Volt Meter	
	Frequency Counter	
	VTVM	
	Audio Analyzer	

7-4. MANUAL TAPE EJECT

When a tape can no be ejected, because of Power failure or mechanical tape damage, remove the tape manually.

1. Turns power off and remove the Top Panel.
2. Rotate the red plastic screw by a Phillips – head screwdriver counterclockwise pushing the screw. It needs to rotate about 30 times rotation until starting to move.
   (See Fig. 7-4-1)

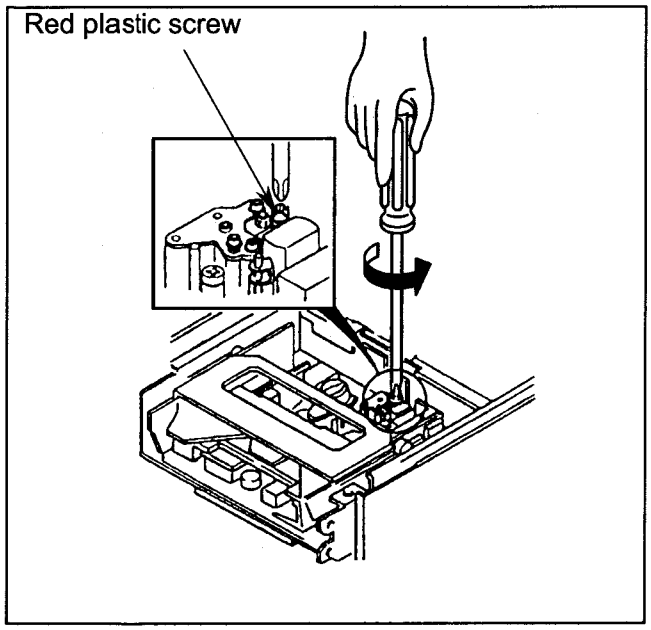


Fig. 7-4-1. Post unloading

3. Since tape slack will develop when the post is unloaded, wind up the supply reel to take up the slack.
   How to take up the slack (See Fig. 7-4-2)
   a. Insert take-up jig into the cassette tape withdrawal opening on the VTR's mechanism side.
   b. Turn the flange part of the supply reel in the direction of take-up to take up the tape slack.
4. Repeat item 2 and 3 until the tape in wound Completely inside of the cassette.

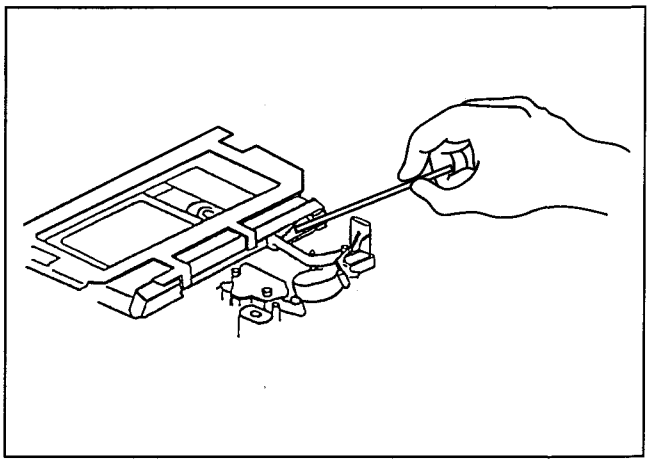


Fig. 7-4-2. Turning S Reel table

5. When the tape is completely inside of the cassette, rotate the red screw in front of the worm gear of the cassette down motor clockwise by a Philips-head screwdriver pushing the screw and remove the cassette cover does not bite the tape when the cover is closed. (See Fig. 7-4-3)

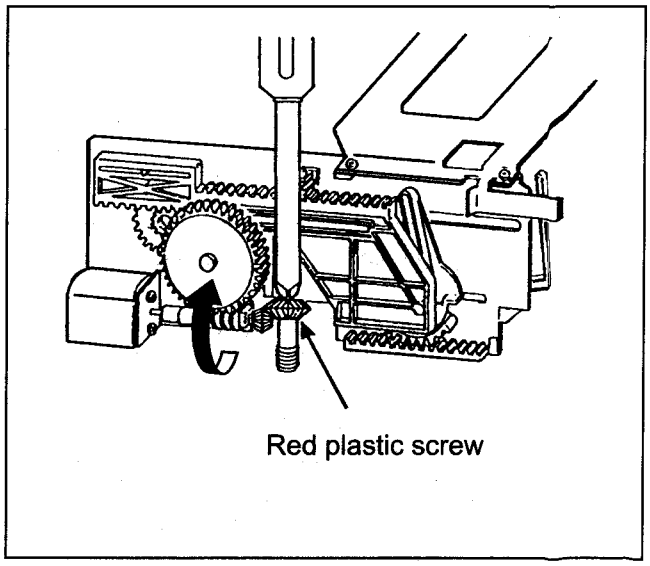


Fig. 7-4-3. Cassette unloading

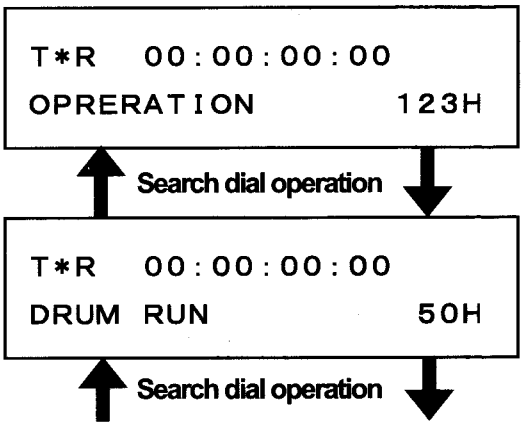
7-5. SERVICE DISPLAYS

7-5-1. Hour Meter Display

1. Push the "DIAG" button.
2. Push the search button under the condition that "DIAG-MENU" is displayed on the Video Monitor.
3. Hour meter is displayed on the Video Monitor and Counter Display (Front Panel).
4. The hour meter of each item can be confirmed by turning serch dial under this condition by the Counter Display (Front Panel).

```
DIAG-MENU        HOURS METER
   Ser  000000001
 * H00  OPERATION     10000H
   H01  DRUM RUN      20000H
   H02  TAPE RUN      30000H
   H03  THREADING     40000T
   H11  DRUM RUN r    20000H
   H12  TAPE RUN r    30000H
   H13  THREADING r   40000T
   END
```

VIDEO MONITOR



Counter display (Front Panel)

<<How to reset Hours meter>>

1. Eject the cassette tape.
2. Turn SW501-1 on SYSCON printed circuit board "ON" .
3. Push "DIAG" button.
4. Push "SERCH" button.
5. After the following figure displayed, adjust "*" to the item to reset. (Only H11, H12, and H13 with "r" can be reset.)
6. Push "RESET" button to display the figure shown right below.
7. Push "PLAY" button to format the selected item.

```
DIAG-MENU        HOURS METER

  H00 OPERATION     10000H
  H01 DRUM RUN      20000H
  H02 TAPE RUN      30000H
  H03 THREADING     40000T
* H11 DRUM RUN r    20000H
  H12 TAPE RUN r    30000H
  H13 THREADING r   40000T
  END
```

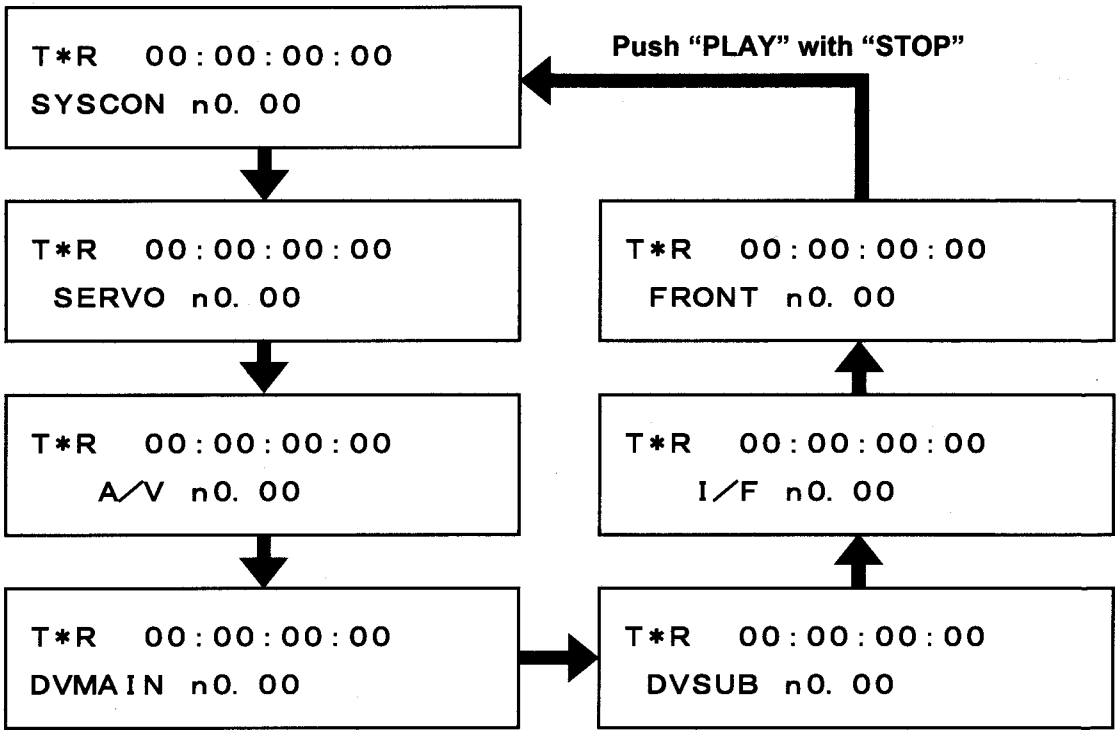
→

```
HOURS METER INIT SET

DRUM RUN r OK?
 YES<PLAY>/NO<STOP>
```

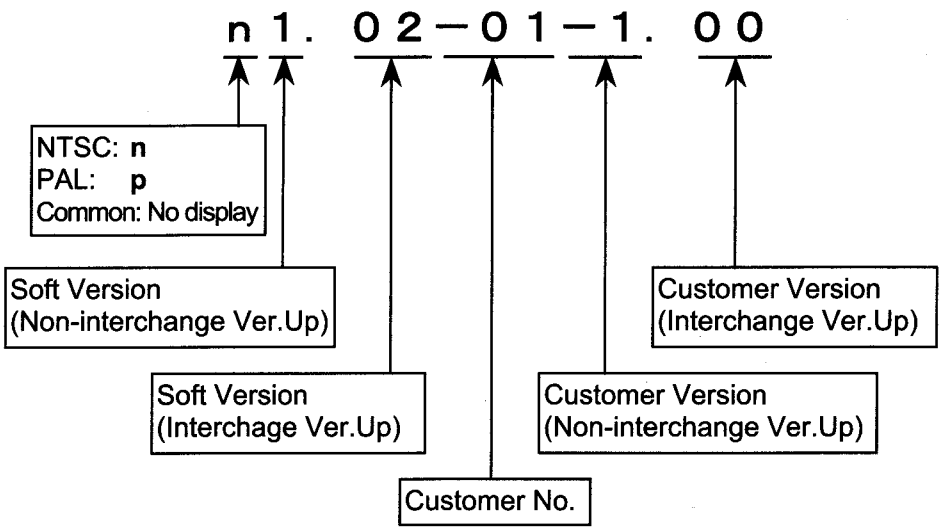
7-5-2. Version display

1. Push the "EJECT" button. (It is ejected when Tape is in.)
2. Push the "PLAY" button together with "STOP" button.
3. Version is displayed on the Counter display (Front Panel).
4. Push the "PLAY" with "STOP" button again, Software Version of each item is displayed.



Counter Display (Front Panel)

≪How to View of Version Display≫



7-5-3. Error Rate Display

<<Confirmation of general error rate>>

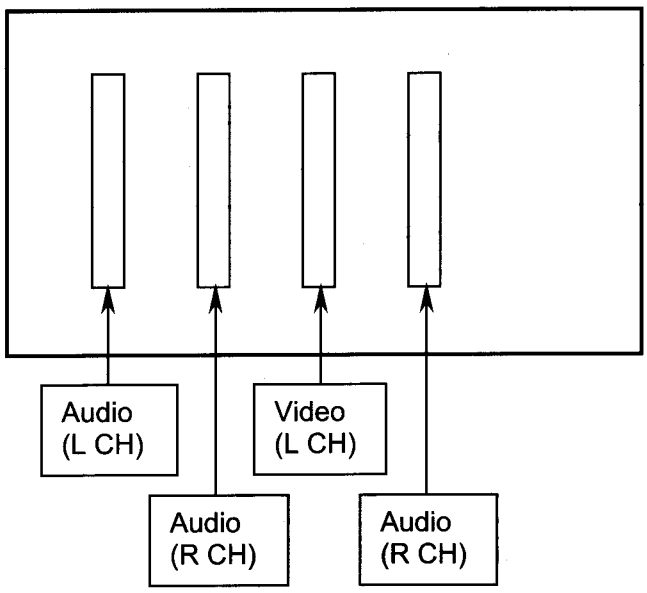
"General Error Rate" shows the playing condition of all of the deck regardless of the head used in playing. When AJ-D940 is in playing, some heads is used to do the slow play even if it is in normal playing. In these heads, the signal in the best condition is used. So in "General Error Rate", confirmation of the condition of each heads or recording condition of tape can not be done.

1. Set the DIP switch SW 4-1 on the version side of the front panel to "ON".
2. Error rate is displayed in window of the signal level display in front of the body.
3. Switching of the display mode can be done by condition of "cue 7", "TC/TCR" and "TC/TB" as shown below.

CUE 7	TC / UB / CTL	INNER	OUTER	CONCEAL
OFF	-	ON	ON	ON
ON	TC	ON	OFF	OFF
	UB	ON	ON	OFF
	CTL	OFF	OFF	OFF

When push "RESET" with "CUE7", CUE7 is OFF.

Window of Signal level display



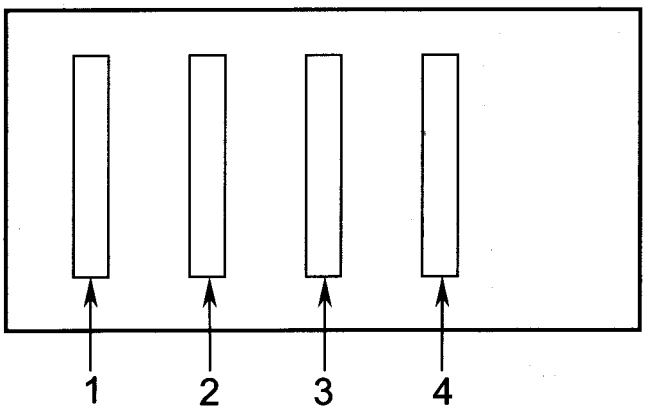
In the case of AJ-D940, it plays with some heads. So error rate is better than that measured by other VTR such as AJ-D950, even if it is the same tape.

<<Confirmation of detailed error rate>>

"Detailed Error Rate" shows the error rate of all of the head being used in playing. Display them on the service menu.

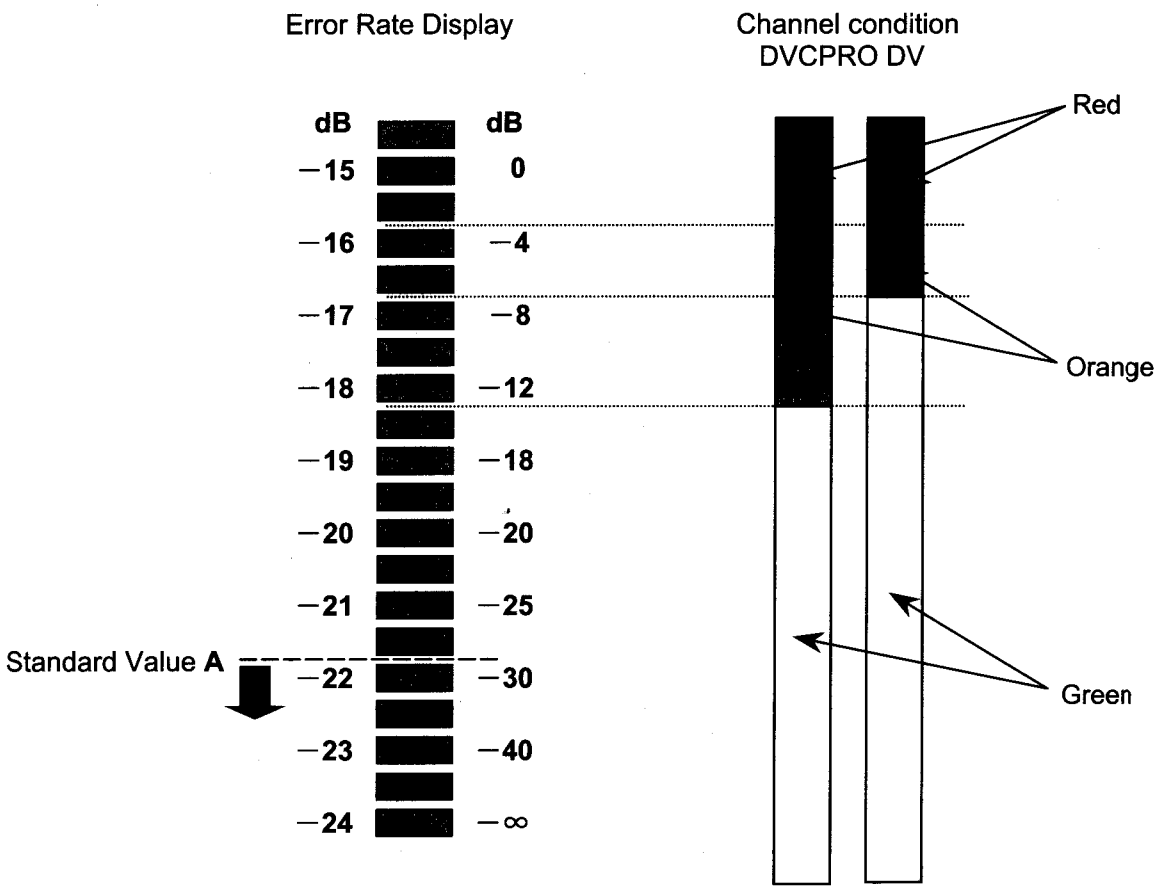
1. Set the DIP switch SW 4-1 on the version side of the front panel to "ON".
2. Set the CF SW on the bottom side of the front panel to "4F/8F".
3. Select one of B00 EQ1, C00 EQ2, and D00 EQ3 in the service menu.
4. In the setting of ATF HEAD of the selected one in 3., select a head to display the error rate.
5. Error rate is displayed in window of the signal level display in front of the body.
6. Press "CUE 8" button to display AUDIO error rate.
7. When push "CUE 8" button with "RESET" button, VIDEO error rate is displayed again.

Window of Signal level display



ATF HEAD	CUE 8 LED	1	2	3	4
PBL13	ON	PBL1 VIDEO	PBL3 VIDEO	PBR1 VIDEO	PBR3 VIDEO
	OFF	PBL1 AUDIO	PBL3 AUDIO	PBR1 AUDIO	PBR3 AUDIO
PBL24	ON	PBL2 VIDEO	PBL4 VIDEO	PBR2 VIDEO	PBR4 VIDEO
	OFF	PBL2 AUDIO	PBL4 AUDIO	PBR2 AUDIO	PBR4 AUDIO
DVL	ON	DVL1 VIDEO	DV L2 VIDEO	DV R1 VIDEO	DV R2 VIDEO
	OFF	DVL1 AUDIO	DV L2 AUDIO	DV R1 AUDIO	DV R2 AUDIO

≪Relation of Error Rate and Display≫



7-6. Service Menu

< Setting the Service Menu >

(1) Verify that the **REMOTE/LOCAL** switch on the front panel is set to **LOCAL**.
(2) Set **DIP SW 1-1** behind the front panel to **ON**.
(3) Pressing the **MENU** button on the front panel will display the following service menu (main item selection mode) in the monitor.

```
SERVICE-MENU
No. A00

* A00 :  SERVO ADJUST
  B00 :  EQ1 ADJUST
  C00 :  EQ2 ADJUST
  D00 :  EQ3 ADJUST
  E00 :  VIDEO ADJUST
  F00 :  AUDIO ADJUST
  G00 :  BACKUP RAM INIT
  H00 :  OTHER ADJUST
  END
```

Main Menu

(4) Turn the **SEARCH** dial to move the * symbol between main items A00 and H00 and make a selection.
(5) Pressing the **SET** button on the front panel will display the menu corresponding to the selected main item.

Explanations of the *SERVO, EQ1, EQ2, EQ3, RF, VIDEO, AUDIO,* and *OTHER* menus can be found on following pages.

Setting Procedure

1) Switching to Service Menu Mode
With
- **REMOTE/LOCAL** switch on front panel set to **LOCAL** and
- **DIP SW1-1** in front panel set to **ON**,

press the **MENU** button.

NOTE: When the menu is entered in SEARCH mode, the previous SEARCH mode settings are preserved. (Of course, since STOP and other modes are enabled in the menu, if the mode is changed, the preceding SEARCH mode settings will be cancelled. Also, once the user exits from SEARCH mode in the menu, the SEARCH mode is not longer accepted.)
Note also that when in SHTL (SLOW) mode, menu selection cannot be performed until the **DIAL** is returned to **STILL** position.

2) Ending Service Menu Mode
To end service menu mode, either
- Press **MENU** button, or
- Set **REMOTE/LOCAL** switch to **REMOTE**.

NOTE: If the menu is entered in SEARCH mode and exited while still in SEARCH, mode, the Unit will return to the SEARCH mode settings prior to entering the menu.
Ex.) SHTL + 1.0 mode → SERVICE MENU **ON** → Change item with **JOG** → SERVICE MENU **OFF** → Remains in SHTL 1.0 mode.
Ex.) SHTL + 1.0 mode → SERVICE MENU **ON** → Change item with **SLOW** → SERVICE MENU **OFF** → Remains in SHTL 1.0 mode → Changing **DIAL** at this point switches to **VAR**, with the speed corresponding to the angle at that time.

3) Keys Used

MENU 1) Switches to service menu mode (main item selection mode)
2) Terminates service menu mode.
3) Returns to main item selection mode from item setting mode.
4) Other (operation when **DEFAULT** is selected)

SET 1) Switches from main item selection mode to item setting mode.
2) Other (operation when **DEFAULT** is selected)

1) JOG mode: In accordance with the speed of rotation, it is possible to move between items during item selection and change settings.
Moving between items is performed using **DIAL**, which moves the * symbol.
Settings can be changed by operating **DIAL** while the **SEARCH** button is pressed.
Rotating **DIAL** in the FWD direction has the following effects.
When selecting an item: The * symbol moves downward.
When entering a setting: The value of the setting increases.
Rotating **DIAL** in the REV direction has the following effects.
When selecting an item: The * symbol moves upward.
When entering a setting: The value of the setting decreases.

2) SHTL (SLOW) mode: In accordance with the angle of rotation, it is possible to move between items during item selection and change settings.
Moving an item is accomplished using **DIAL**, which moves the * symbol.
Settings can be changed by operating **DIAL** while the **SEARCH** button is pressed.
Rotating **DIAL** in the FWD direction has the following effects.
When selecting an item: The * symbol moves downward.
When entering a setting: The value of the setting increases.
Rotating **DIAL** in the REV direction has the following effects.
When selecting an item: The * symbol moves upward.
When entering a setting: The value of the setting decreases.

SEARCH Switches the value of a setting.
Settings can be changed by operating **DIAL** while the **SEARCH** button is pressed.

FF (REW) The VTR operates in every mode.
PLAY
STNDBY OFF
STOP
EJECT
PREROLL

FF (REW) + PLAY → ± 1.0 speed increase to SHTL. ("SEARCH" LED is lit)
Other → It is possible to perform CUE point registration and deletion.

4) Data Confirmation
Memory is rewritten upon returning to the main item selection mode (main menu) from the item setting mode (each ADJUST menu).

Service Menu

A00: SERVO ADJUST

* Setting column indicates variable range.

No.	Item	Setting	Content of Adjustment or Setting	Remarks
A01	T TORQUE	-128 to 127	Correct the offset of T reel motor driver. [Operation] 1. Place in EJECT mode. 2. Turn MENU **ON** and select item. 3. Press **SEARCH** to initiate the following operation: 1) T BRAKE SOL turns **OFF**. 2) Cylinder rotates. 3) Mechanism loads to Loading Completed position. 4. Use **DIAL** to set value. 5. After setting, release the **STOP** button. The operation is complete when the following actions end: 1) T BRAKE SOL turns **ON**. 2) Cylinder stops rotating. 3) Mechanism unloads. 6. Press the **MENU** button. (NOTE) Pressing the **MENU** button at step 6 above returns the display to the main item selection screen, therefore to continue with S TORQUE adjustments, press the **MENU** button again at the end. BACKUP	Operations 1 and 2 may be performed in reverse order, however this mode is only valid in EJECT mode. If a cassette is inserted while in this mode, the operation described to the left will be cancelled, and the operation will switch to CASSETTE IN. Any changed values will also be cancelled.
A02	S TORQUE	-128 to 127	Correct the offset of S reel motor driver. [Operation] 1. Place in EJECT mode. 2. Turn MENU **ON** and select item. 3. Press **SEARCH** to initiate the following operation: 1) S BRAKE SOL turns **OFF**. 2) Cylinder rotates. 3) Mechanism loads to Loading Completed position. 4. Use **DIAL** to set value. 5. After setting, release the **STOP** button. The operation is complete when the following actions end: 1) S BRAKE SOL turns **ON**. 2) Cylinder stops rotating. 3) Mechanism unloads. 6. Press the **MENU** button. (NOTE) Pressing the **MENU** button at step 6 above returns the display to the main item selection screen, therefore to perform S TORQUE adjustments, press the **MENU** button again at the end. BACKUP	Operations 1 and 2 may be performed in reverse order, however, this mode is only valid in EJECT mode. If a cassette is inserted while in this mode, the operation described to the left will be cancelled, and the operation will switch to CASSETTE IN. Any changed values will also be cancelled.
A03	PG SHIFTER	0 to 4095	Use standard tape to perform automatic PG mono/multi adjustment. [Operation] 1. Turn MENU **ON** and select item. 2. Set to PLAY mode. 3. Automatic adjustment is performed while the **SEARCH** button is pressed. 1) When the button is pressed, the adjusted value disappears from the display. 2) After automatic adjustment is completed, the new value is displayed. < NOTE > If the **SEARCH** button is released during adjustment, the previous adjusted value will be retained. 4. Release the **SEARCH** button. BACKUP	

No.	Item	Setting	Content of Adjustment or Setting	Remarks
A04	PBL13B GAIN	-128 to 127	Adjust the PBL13 head ATF pre-filter gain. (For DVCPRO50 ATF playback) When this item is selected, ATF lock playback using the PBR13 head starts in DVCPRO50 mode. *BACKUP	Setting may only be changed after the LOAD operation is completed.
A05	PBL13 LINEAR	Non-display ON	Linearity measurement When this item is selected, ATF lock playback using the PBR13 head starts in DVCPRO50 mode. [Operation] 1. When the cursor arrives at this item, **ON** (non-display) is enabled. 2. When the cursor moves away from this item, non-display is disabled. (The same applies when returning to a main item and when the user exits MENU.)	
A06	PBL24 GAIN	-128 to 127	Adjust the PBL24 head ATF pre-filter gain. When this item is selected, ATF lock playback using the PBR24 head starts in DVCPRO50 mode. *BACKUP	Setting may only be changed after the LOAD operation is completed.
A07	PBL24 LINEAR	Non-display ON	Linearity measurement When this item is selected, ATF lock playback using the PBR24 head starts in DVCPRO50 mode. [Operation] 1. When the cursor arrives at this item, **ON** (non-display) is enabled. 2. When the cursor moves away from this item, non-display is disabled. (The same applies when returning to a main item and when the user exits MENU.)	
A08	PBR24 GAIN	-128 to 127	Adjust the PBL24 head ATF pre-filter gain. (For DVCPRO ATF playback) When this item is selected, ATF lock playback using the PBR24 head starts in DVCPRO50 mode. *BACKUP	Setting may only be changed after the LOAD operation is completed.

——— indicates factory default mode.

No.	Item	Setting	Content of Adjustment or Setting	Remarks
A09	PBR24 LINEAR	Non-display ON	Linearity measurement When this item is selected, ATF lock playback using the PBR24 head starts in DVCPRO50 mode. [Operation] 1. When the cursor arrives at this item, **ON** (non-display) is enabled. 2. When the cursor moves away from this item, non-display is disabled. (The same applies when returning to a main item and when the user exits MENU.)	
A10	DVL GAIN	-128 to 128	Adjust the DVL12 head ATF pre-filter gain. When this item is selected, ATF lock playback using the DVL12 head starts in DVCPRO50 mode. *BACKUP	Setting may only be changed after the LOAD operation is completed.
A11	DVL LINEAR	Non-display ON	Linearity measurement When this item is selected, ATF lock playback using the DVL12 head starts in DVCPRO50 mode. [Operation] 1. When the cursor arrives at this item, **ON** (non-display) is enabled. 2. When the cursor moves away from this item, non-display is disabled. (The same applies when returning to a main item and when the user exits MENU.)	
A12	DVR GAIN	-128 to 127	Adjust DVR12 head ATF pre-filter gain. (For DV ATF playback) This item is adjusted using a DV cassette (S cassette). When this item is selected, ATF lock playback using the DVR12 head starts. *BACKUP	Setting may only be changed after the LOAD operation is completed.

——— indicates factory default mode.

No.	Item	Setting	Content of Adjustment or Setting	Remarks
A13	DVR LINEAR	Non-display **ON**	Linearity measurement This item is adjusted using a DV cassette (S cassette). When this item is selected, ATF lock playback using the DVR12 head starts. [Operation] 1. When the cursor arrives at this item, **ON** (non-display) is enabled. 2. When the cursor moves away from this item, non-display is disabled. (The same applies when returning to a main item and when the user exits MENU.)	
A14	ENV SEL 25M	0 PBL13 1 PBL24 2 DVL	Envelope output verification head selection This item is confirmed with DVCPRO (25M) tape. When this item is selected, CTL lock playback/2-speed PLAY starts in DVCPRO mode, with CTL locked to a phase that allows the output of the selected head to be verified. Fine adjustment is performed using A15:TRK VAL 25M.	Setting may only be changed after the LOAD operation is completed.
A15	TRK VAL 25M	-128 to 127	Tracking offset setting This item is confirmed with DVCPRO (25M) tape. When this item is selected, CTL lock playback/2-speed PLAY starts in DVCPRO mode.	Setting may only be changed after the LOAD operation is completed.
A16	FORCED 25M	Non-display **ON**	Forced 25M playback mode selection This item is confirmed with DVCPRO (25M) tape. When this item is selected, ATF lock playback starts in DVCPRO mode. [Operation] 1. When the cursor arrives at this item, **ON** (non-display) is enabled. 2. When the cursor moves away from this item, non-display is disabled. (The same applies when returning to a main item and when the user exits MENU.)	

——— indicates factory default mode.

B00: EQ1 ADJUST

* Setting column indicates variable range.

No.	Item	Setting	Content of Adjustment or Setting	Remarks
B01	RF PHS DVL1	-128 to 127	DV L1 head PreEQ phase correction * BACKUP	Setting may only be changed after the LOAD operation is completed.
B02	RF PHS DVL2	-128 to 127	DV L2 head PreEQ phase correction * BACKUP	Setting may only be changed after the LOAD operation is completed.
B03	RF PHS DVR1	-128 to 127	DV R1 head PreEQ phase correction * BACKUP	Setting may only be changed after the LOAD operation is completed.
B04	RF PHS DVR2	-128 to 127	DV R2 head PreEQ phase correction * BACKUP	Setting may only be changed after the LOAD operation is completed.
B05	RF MAG DVL1	-128 to 127	DV L1 head PreEQ gain correction * BACKUP	Setting may only be changed after the LOAD operation is completed.
B06	RF MAG DVL2	-128 to 127	DV L2 head PreEQ gain correction * BACKUP	Setting may only be changed after the LOAD operation is completed.
B07	RF MAG DVR1	-128 to 127	DV R1 head PreEQ gain correction * BACKUP	Setting may only be changed after the LOAD operation is completed.
B08	RF MAG DVR2	-128 to 127	DV R2 head PreEQ gain correction * BACKUP	Setting may only be changed after the LOAD operation is completed.
B09	PLL PHASE L12	-128 to 127	DV L12 head PLL punching phase adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
B10	PLL SLICE L12	-128 to 127	DV L12 head PLL slice level adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
B11	AEQ L12	-128 to 127	DV L12 head AUTO EQ phase adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
B12	GAIN L1	-128 to 127	DV L1 head EQ amplitude direction adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
B13	PHASE L1	-128 to 127	DV L1 head EQ phase direction adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
B14	GAIN L2	-128 to 127	DV L2 head EQ amplitude direction adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.

No.	Item	Setting	Content of Adjustment or Setting	Remarks
B15	PHASE L2	-128 to 127	DV L2 head EQ phase direction adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
B16	MAIN DL L12	-128 to 127	DV L12 head EQ delay line adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
B17	VTB GAIN L12	-31 to 32	DV L12 head Viterbi decode A/2 input level adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
B18	PLL PHASE R12	-128 to 127	DV R12 head PLL punching phase adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
B19	PLL SLICE R12	-128 to 127	DV R12 head PLL slice level adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
B20	AEQ R12	-128 to 127	DV R12 head AUTO EQ phase adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
B21	GAIN R1	-128 to 127	DV R1 head EQ amplitude direction adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
B22	PHASE R1	-128 to 127	DV R1 head EQ phase direction adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
B23	GAIN R2	-128 to 127	DV R2 head EQ amplitude direction adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
B24	PHASE R2	-128 to 127	DV R2 head EQ phase direction adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
B25	MAIN DL R12	-128 to 127	DV R12 head EQ delay line adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
B26	VTB GAIN R12	-31 to 32	DV R12 head Viterbi decode A/2 input level adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
B27	VCLK SEL L12	0 to 63	DV L12 head Viterbi clock selection * BACKUP	Setting may only be changed after the LOAD operation is completed.
B28	VCLK SEL R12	0 to 63	DV R12 head Viterbi clock selection * BACKUP	Setting may only be changed after the LOAD operation is completed.

No.	Item	Setting	Content of Adjustment or Setting	Remarks
B29	ECC MODE	0 ALL ON 1 OT OFF 2 AL OFF	INNER ON / OUTER ON INNER ON / OUTER OFF INNER OFF / OUTER OFF	1. Upon returning to main item selection mode, the setting returns to the factory default. 2. Setting may only be changed after completing EJECT and LOAD operations.
B30	CONCEAL MODE	0 ON 1 OFF	CONCEAL ON CONCEAL OFF	1. Upon returning to main item selection mode, the setting returns to the factory default. 2. Setting may only be changed after completing EJECT and LOAD operations.
B31	VITERBI MODE	1 ON 2 OFF	Viterbi control ON Viterbi control OFF	1. Upon returning to main item selection mode, the setting returns to the factory default. 2. Setting may only be changed after completing EJECT and LOAD operations.
B32	ERROR MODE	0 FAST 1 SLOW	ERROR RATE display (FAST) ERROR RATE display (SLOW)	1. Upon returning to main item selection mode, the setting returns to the factory default. 2. Setting may only be changed after completing EJECT and LOAD operations.
B33	TRACKING MODE	0 ATF 1 CTL	Switch between 2 types of tracking.	1. Upon returning to main item selection mode, the setting returns to the factory default. 2. Setting may only be changed after completing EJECT and LOAD operations.
B34	TRACKING VAL	-128 to 127	Set the corresponding value in the case of CTL control.	• Valid in PLAY. • Upon returning to main item selection mode, the setting returns to the factory default.
B35	ATF HEAD	0 PBL13 1 PBR24 2 DVL	Select ATF control head.	1. Upon returning to main item selection mode, the setting returns to the factory default.
B36	EQ AUTO ADJ			
B37	DEFAULT	0 LOAD 1 SAVE	Returns each adjusted value to its factory default setting. Stores each adjusted value as the factory default setting.	LOAD and SAVE are only possible after completing a LOAD operation.

——— indicates factory default mode.

C00: EQ2 ADJUST

* Setting column indicates variable range.

No.	Item	Setting	Content of Adjustment or Setting	Remarks
C01	RF PHS PBL1	-128 to 127	PB L1 head PreEQ phase correction *BACKUP	Setting may only be changed after the LOAD operation is completed.
C02	RF PHS PBL3	-128 to 127	PB L3 head PreEQ phase correction *BACKUP	Setting may only be changed after the LOAD operation is completed.
C03	RF PHS PBL2	-128 to 127	PB L2 head PreEQ phase correction *BACKUP	Setting may only be changed after the LOAD operation is completed.
C04	RF PHS PBL4	-128 to 127	PB L4 head PreEQ phase correction *BACKUP	Setting may only be changed after the LOAD operation is completed.
C05	RF MAG PBL1	-128 to 127	PB L1 head PreEQ gain correction *BACKUP	Setting may only be changed after the LOAD operation is completed.
C06	RF MAG PBL3	-128 to 127	PB L3 head PreEQ gain correction *BACKUP	Setting may only be changed after the LOAD operation is completed.
C07	RF MAG PBL2	-128 to 127	PB L2 head PreEQ gain correction *BACKUP	Setting may only be changed after the LOAD operation is completed.
C08	RF MAG PBL4	-128 to 127	PB L4 head PreEQ gain correction *BACKUP	Setting may only be changed after the LOAD operation is completed.
C09	PLL PHASE L13	-128 to 127	PB L13 head PLL punching phase adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.
C10	PLL SLICE L13	-128 to 127	PB L13 head PLL slice level adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.
C11	AEQ L13	-128 to 127	PB L13 head AUTO EQ phase adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.
C12	GAIN L1	-128 to 127	PB L1 head EQ amplitude direction adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.
C13	PHASE L1	-128 to 127	PB L1 head EQ phase direction adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.
C14	GAIN L3	-128 to 127	PB L3 head EQ amplitude direction adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.

No.	Item	Setting	Content of Adjustment or Setting	Remarks
C15	PHASE L3	-128 to 127	PB L3 head EQ phase direction adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.
C16	MAIN DL L13	-128 to 127	PB L13 head EQ delay line adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.
C17	VTB GAIN L13	-31 to 32	PB L13 head Viterbi decode A/2 input level adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.
C18	PLL PHASE L24	-128 to 127	PB L24 head PLL punching phase adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.
C19	PLL SLICE L24	-128 to 127	PB L24 head PLL slice level adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.
C20	AEQ L24	-128 to 127	PB L24 head AUTO EQ phase adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.
C21	GAIN L2	-128 to 127	PB L2 head EQ amplitude direction adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.
C22	PHASE L2	-128 to 127	PB L2 head EQ phase direction adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.
C23	GAIN L4	-128 to 127	PB L4 head EQ amplitude direction adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.
C24	PHASE L4	-128 to 127	PB L4 head EQ phase direction adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.
C25	MAIN DL L24	-128 to 127	PB L24 head EQ delay line adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.
C26	VTB GAIN L24	-31 to 32	PB L24 head Viterbi decode A/2 input level adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.
C27	VCLK SEL L13	0 to 63	PB L13 head Viterbi clock selection *BACKUP	Setting may only be changed after the LOAD operation is completed.
C28	VCLK SEL L24	0 to 63	PB L24 head Viterbi clock selection *BACKUP	Setting may only be changed after the LOAD operation is completed.

No.	Item	Setting	Content of Adjustment or Setting	Remarks
C29	ECC MODE	0 ALL ON 1 OT OFF 2 AL OFF	INNER ON / OUTER ON INNER ON / OUTER OFF INNER OFF / OUTER OFF	1. Upon returning to main item selection mode, the setting returns to the factory default. 2. Setting may only be changed after completing EJECT and LOAD operations.
C30	CONCEAL MODE	0 ON 1 OFF	CONCEAL ON CONCEAL OFF	1. Upon returning to main item selection mode, the setting returns to the factory default. 2. Setting may only be changed after completing EJECT and LOAD operations.
C31	VITERBI MODE	1 ON 2 OFF	Viterbi control ON Viterbi control OFF	1. Upon returning to main item selection mode, the setting returns to the factory default. 2. Setting may only be changed after completing EJECT and LOAD operations.
C32	ERROR MODE	0 FAST 1 SLOW	ERROR RATE display (FAST) ERROR RATE display (SLOW)	1. Upon returning to main item selection mode, the setting returns to the factory default. 2. Setting may only be changed after completing EJECT and LOAD operations.
C33	TRACKING MOD	0 ATF 1 CTL	Switch between 2 types of tracking.	1. Upon returning to main item selection mode, the setting returns to the factory default. 2. Setting may only be changed after completing EJECT and LOAD operations.
C34	TRACKING VAL	-128 to 127	Set the corresponding value in the case of CTL control.	• Valid in PLAY. • Upon returning to main item selection mode, the setting returns to the factory default.
C35	ATF HEAD	0 PBL13 1 PBR24 2 DVL	Select ATF control head.	1. Upon returning to main item selection mode, the setting returns to the factory default.
C36	EQ AUTO ADJ			
C37	DEFAULT	0 to 1	Returns each adjusted value to its factory default setting. Stores each adjusted value as the factory default setting.	LOAD and SAVE are only possible after completing a LOAD operation.

——— indicates factory default mode.

The DEFAULT procedure for No. C24 is the same as that given in the RF ADJUST menu.

D00: EQ3 ADJUST

No.	Item	Setting	Content of Adjustment or Setting	Remarks
D01	RF PHS PBR1	-128 to 127	PB R1 head PreEQ phase correction *BACKUP	Setting may only be changed after the LOAD operation is completed.
D02	RF PHS PBR3	-128 to 127	PB R3 head PreEQ phase correction *BACKUP	Setting may only be changed after the LOAD operation is completed.
D03	RF PHS PBR2	-128 to 127	PB R2 head PreEQ phase correction *BACKUP	Setting may only be changed after the LOAD operation is completed.
D04	RF PHS PBR4	-128 to 127	PB R4 head PreEQ phase correction *BACKUP	Setting may only be changed after the LOAD operation is completed.
D05	RF MAG PBR1	-128 to 127	PB R1 head PreEQ gain correction *BACKUP	Setting may only be changed after the LOAD operation is completed.
D06	RF MAG PBR3	-128 to 127	PB R3 head PreEQ gain correction *BACKUP	Setting may only be changed after the LOAD operation is completed.
D07	RF MAG PBR2	-128 to 127	PB R2 head PreEQ gain correction *BACKUP	Setting may only be changed after the LOAD operation is completed.
D08	RF MAG PBR4	-128 to 127	PB R4 head PreEQ gain correction *BACKUP	Setting may only be changed after the LOAD operation is completed.
D09	PLL PHASE R13	-128 to 127	PB R13 head PLL punching phase adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.
D10	PLL SLICE R13	-128 to 127	PB R13 head PLL slice level adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.
D11	AEQ R13	-128 to 127	PB R13 head AUTO EQ phase adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.
D12	GAIN R1	-128 to 127	PB R1 head EQ amplitude direction adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.
D13	PHASE R1	-128 to 127	PB R1 head EQ phase direction adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.
D14	GAIN R3	-128 to 127	PB R3 head EQ amplitude direction adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.
D15	PHASE R3	-128 to 127	PB R3 head EQ phase direction adjustment *BACKUP	Setting may only be changed after the LOAD operation is completed.

No.	Item	Setting	Content of Adjustment or Setting	Remarks
D16	MAIN DL R13	-128 to 127	PB R13 head EQ delay line adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
D17	VTB GAIN R13	-31 to 32	PB R13 head Viterbi decode A/2 input level adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
D18	PLL PHASE R24	-128 to 127	PB R24 head PLL punching phase adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
D19	PLL SLICE R24	-128 to 127	PB R24 head PLL slice level adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
D20	AEQ R24	-128 to 127	PB R24 head AUTO EQ phase adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
D21	GAIN R2	-128 to 127	PB R2 head EQ amplitude direction adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
D22	PHASE R2	-128 to 127	PB R2 head EQ phase direction adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
D23	GAIN R4	-128 to 127	PB R4 head EQ amplitude direction adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
D24	PHASE R4	-128 to 127	PB R4 head EQ phase direction adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
D25	MAIN DL R24	-128 to 127	PB R24 head EQ delay line adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
D26	VTB GAIN R24	-31 to 32	PB R24 head Viterbi decode A/2 input level adjustment * BACKUP	Setting may only be changed after the LOAD operation is completed.
D27	VCLK SEL R13	0 to 63	PB R13 head Viterbi clock selection * BACKUP	Setting may only be changed after the LOAD operation is completed.
D28	VCLK SEL R24	0 to 63	PB R24 head Viterbi clock selection * BACKUP	Setting may only be changed after the LOAD operation is completed.

No.	Item	Setting	Content of Adjustment or Setting	Remarks
D29	ECC MODE	0 ALL ON 1 OT OFF 2 AL OFF	INNER ON / OUTER ON INNER ON / OUTER OFF INNER OFF / OUTER OFF	1. Upon returning to main item selection mode, the setting returns to the factory default. 2. Setting may only be changed after completing EJECT and LOAD operations.
D30	CONCEAL MODE	0 ON 1 OFF	CONCEAL ON CONCEAL OFF	1. Upon returning to main item selection mode, the setting returns to the factory default. 2. Setting may only be changed after completing EJECT and LOAD operations.
D31	VITERBI MODE	1 ON 2 OFF	Viterbi control ON Viterbi control OFF	1. Upon returning to main item selection mode, the setting returns to the factory default. 2. Setting may only be changed after completing EJECT and LOAD operations.
D32	ERROR MODE	0 FAST 1 SLOW	ERROR RATE display (FAST) ERROR RATE display (SLOW)	1. Upon returning to main item selection mode, the setting returns to the factory default. 2. Setting may only be changed after completing EJECT and LOAD operations.
D33	TRACKING MODE	0 ATF 1 CTL	Switch between 2 types of tracking.	1. Upon returning to main item selection mode, the setting returns to the factory default. 2. Setting may only be changed after completing EJECT and LOAD operations.
D34	TRACKING VAL	-128 to 127	Set the corresponding value in the case of CTL control.	• Valid in PLAY. • Upon returning to main item selection mode, the setting returns to the factory default.
D35	ATF HEAD	0 PBL13 1 PBR24 2 DVL	Select ATF control head.	1. Upon returning to main item selection mode, the setting returns to the factory default.
D36	EQ AUTO ADJ			
D37	DEFAULT	0 LOAD 1 SAVE	Returns each adjusted value to its factory default setting. Stores each adjusted value as the factory default setting.	LOAD and SAVE are only possible after completing a LOAD operation.

——— indicates factory default mode.

E00: VIDEO ADJUST

No.	Item	Setting	Content of Adjustment or Setting	Remarks
E01	VIDEO BLANK	0 NORMAL 1 OFF		1. Upon returning to main item selection mode, the setting returns to the factory default. 2. Setting may only be changed after completing EJECT and LOAD operations.
E02	VIDEO MUTE	0 NORMAL 1 MUTE		1. Upon returning to main item selection mode, the setting returns to the factory default. 2. Setting may only be changed after completing EJECT and LOAD operations.

——— indicates factory default mode.

F00: AUDIO ADJUST

No.	Item	Setting	Content of Adjustment or Setting	Remarks
F01	REF LEVEL1	0 FS-20 1 FS-18 2 FS-12	Select basic audio output level. 0: Full scale –20dB (initial factory default for NTSC) 1: Full scale –18dB (initial factory default for PAL) 2: Full scale –12dB • Setting may be changed only when F02:REF LEVEL2 = 0dB. • If the front meter is in FINE mode display when setting FS-12, no marker will be displayed. [redacted]	
F02	REF LEVEL2	0 0dB 1 –3dB	Select switching of the basic audio output level in SETUP MENU. 0 : Switching between -20/0/+4dB is possible. (Normal specification) 1 : -3dB only (German specification) • Setting may only be changed when F01:REF LEVEL1 = FS-18. [redacted]	
F03	REF LV INI	0 0dB 1 3dB	SETUP MENU for switching basic audio output level. Set 706: CH1 OUT LV 710:CUE OUT LV 707: CH2 OUT LV 711:MONIL OUT LV 708: CH3 OUT LV 712:MONIR OUT LV 709: CH4 OUT LV to factory default values. 0: 0dB (initial factory default for P,E) 1: 4dB (initial factory default for T) • Note, however, that when F02:REF LEVEL2 = -2dB, output is fixed at -3dB, regardless of the setting. • After changing the setting, the setting is enabled the next time an INIT operation is performed from SETUP MENU. [redacted]	

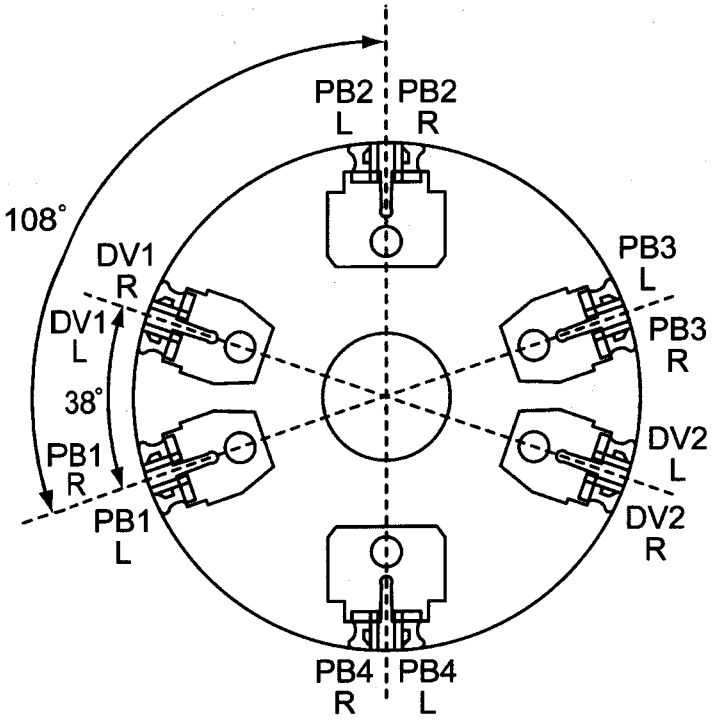
——— indicates factory default mode.

H00: OTHER ADJUST

No.	Item	Setting	Content of Adjustment or Setting	Remarks
H01	STILL LIMIT	0 6min 1 6min	Select the upper limit of SETUP MENU 400: STILL TIMER. 0: 2min 1: 6min [redacted]	
H02	SYSTEM TYPE	0 TYPE 1 1 TYPE 2	Select whether or not to add ×2.3 speed increase to SHTL mode speed. 0: No ×2.3 speed increase 1: ×2.3 speed increase [redacted]	

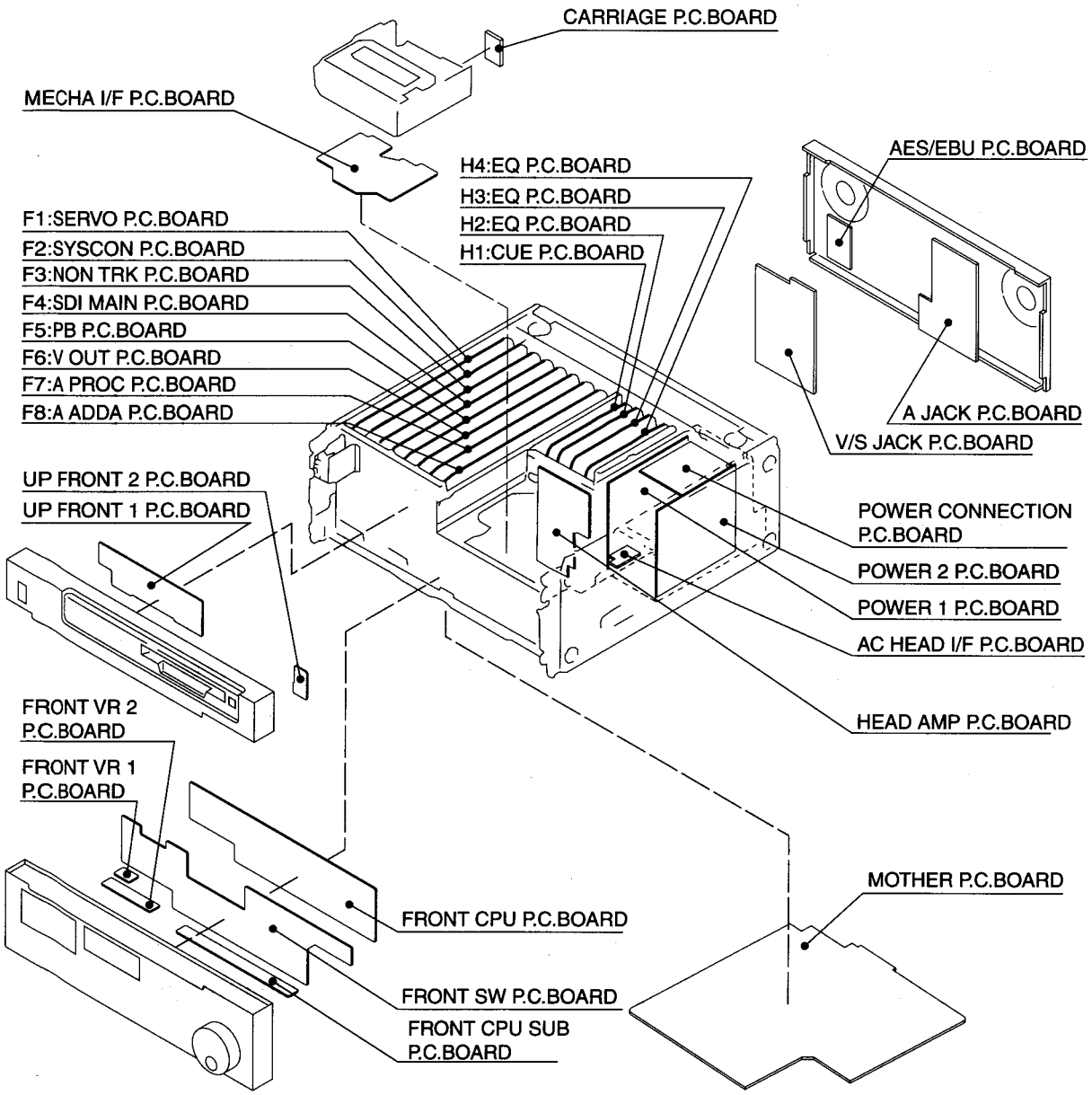
——— indicates factory default mode.

7-7. CYLINDER HEAD

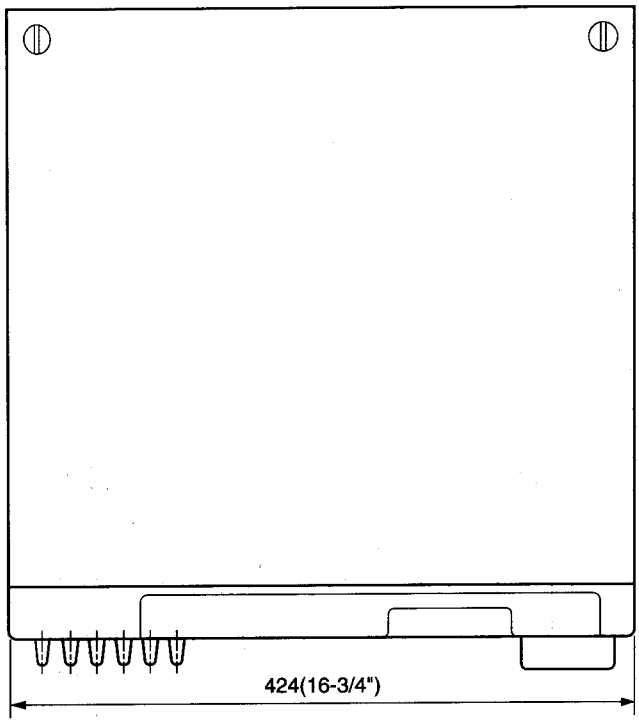


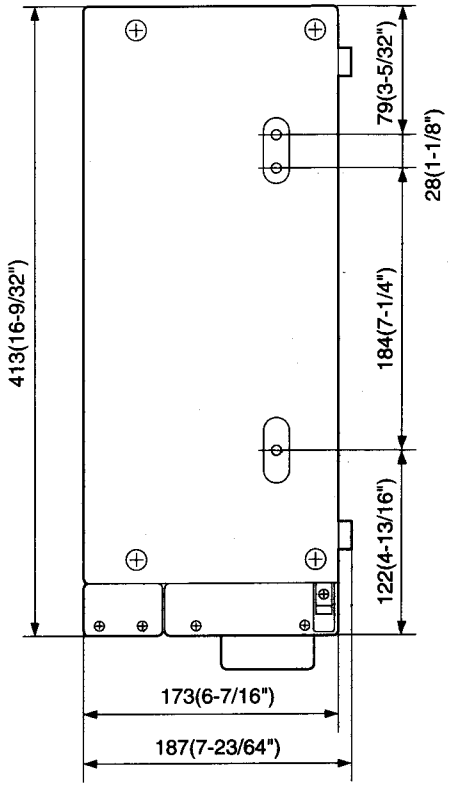
HEAD	HEAD WIDTH (μ m)
PB1 - L	27
PB1 - R	
PB2 - R	
PB2 - R	
PB3 - R	
PB3 - R	
PB4 - R	
PB4 - R	
DV1 - R	18
DV1 - R	
DV2 - R	
DV2 - R	

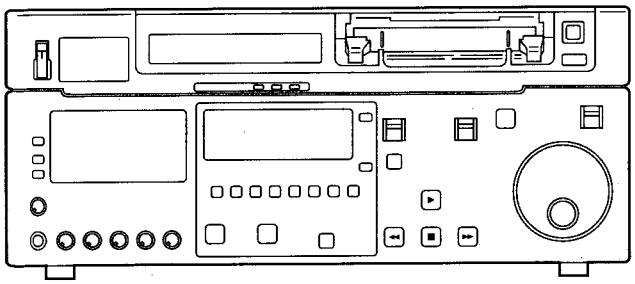
7-8. BOARDS LOCATION



7-9. DIMENSIONS







Unit:mm(inch)

SECTION 8

ELECTRICAL ADJUSTMENT

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SECTION 8

ELECTRICAL ADJUSTMENT

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[illegible] 8-15
[illegible] 8-16
[illegible] 8-17
[illegible] 8-18
[illegible] 8-19
[illegible] 8-20
[illegible] 8-21
[illegible] 8-22
[illegible] .....

1. POWER SUPPLY UNIT

C.B.A.	POWER UNIT
TP	TP6 (+5V), TP2 (+12V) (on extension board)
ADJ.	VR1 (+5V), VR2 (+12V)
TAPE	-
INPUT	-
MODE	EJECT
M. EQ	DVM
SPEC.	+5.05V±0.05V +11.8V±0.6V

1. Extend the SYSCON board (F2) using an F-sized extension board.
2. Turn power ON, and verify that ***EJECT*** is displayed in VIDEO OUT 3.
3. Connect DVM to TP6 and TP7 on the extension board, and adjust VR1 and VR2 until they reach the Specifications given in the table above.

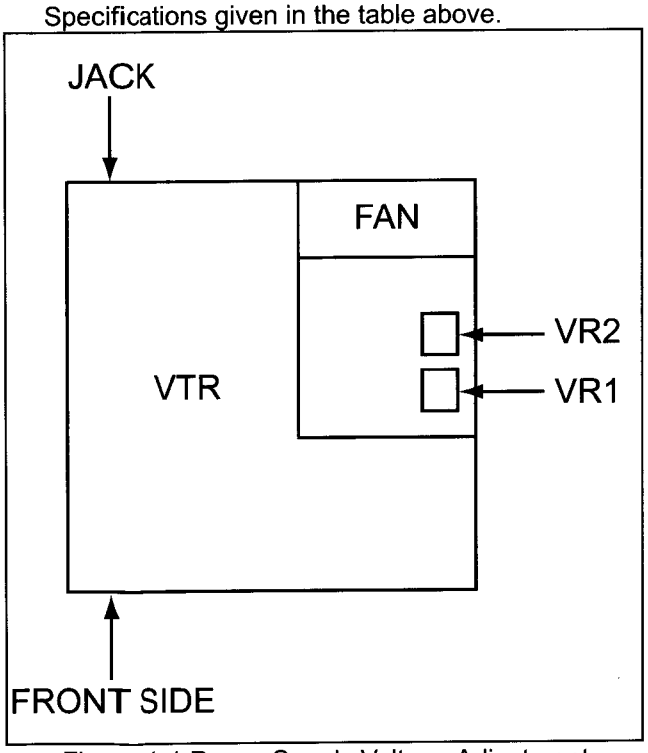


Figure 1-1 Power Supply Voltage Adjustment

2. MECHANISM INTERFACE

2-1. Photosensor Sensitivity Adjustment

C.B.A.	Mechanism interface
TP	S Side: TP13 or 26A of P2 SYSCON P board T Side: TP14 or 25A of P2 SYSCON P board
ADJ.	SW200
TAPE	-
INPUT	-
MODE	STOP
M. EQ	Oscilloscope
SPEC.	A = 3.0 to 4.3V

1. Insert the tape end-detection adjustment cassette (VFK1369).
2. Observe the waveforms on both the S and the T sides.
3. Set the switches on the S and T sides (SW200) so that voltage A reaches the standard given in the table above.

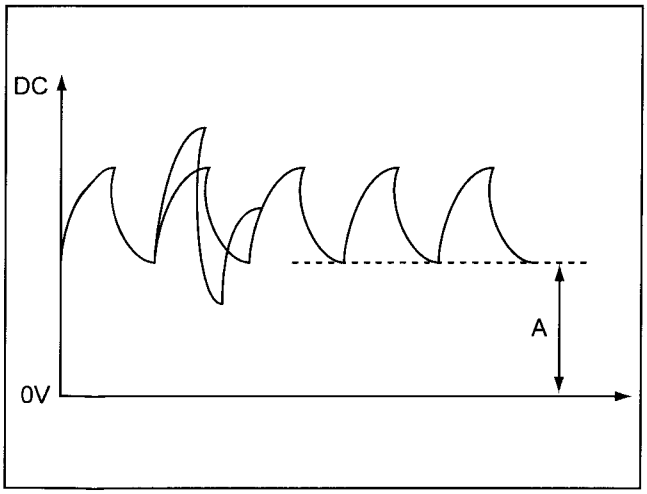
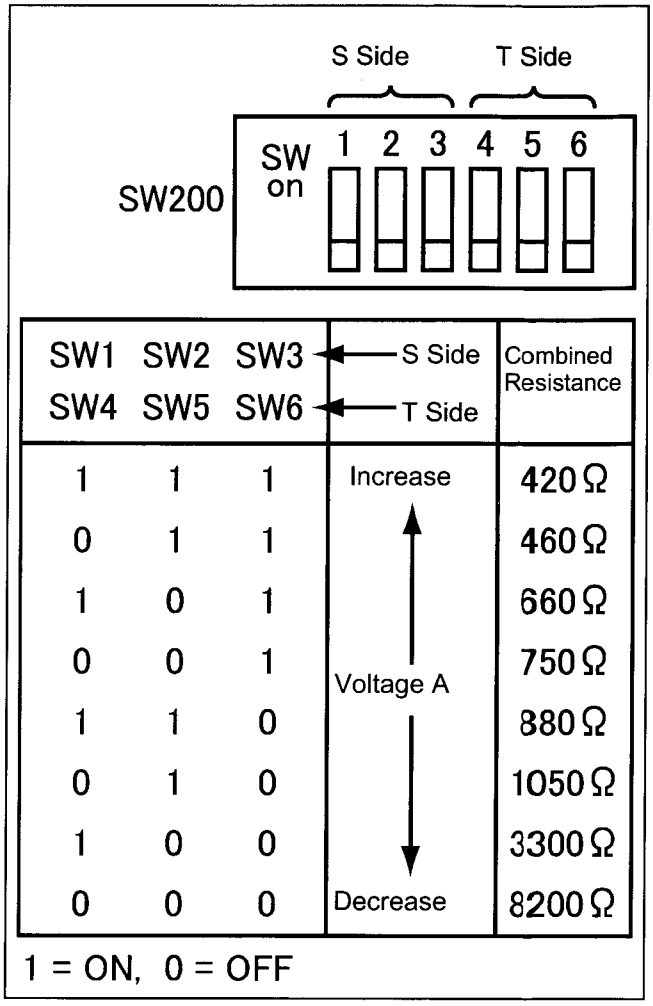


Figure 2-1 Photosensor Sensitivity Adjustment



SW1 SW2 SW3 ← S Side SW4 SW5 SW6 ← T Side				Combined Resistance
1	1	1	Increase	420Ω
0	1	1		460Ω
1	0	1		660Ω
0	0	1	Voltage A	750Ω
1	1	0		880Ω
0	1	0		1050Ω
1	0	0		3300Ω
0	0	0	Decrease	8200Ω

1 = ON, 0 = OFF

Figure 2-2 Sensitivity Adjustment Switch Settings

3. SERVO (F1)

C.B.A.	SERVO (F1)
TP	Reel block
ADJ.	Service Menu : SERVO
TAPE	-
INPUT	-
MODE	SERVICE MODE
M. EQ	Dial torque gauge
SPEC.	15g-cm±2g-cm (Mean of 5 times)

1. Remove the front loading unit. (Refer to ***Section 2 Disassembly and Maintenance***)
2. Attach the **carriage jig** (***Figure 3-1***) to the **P1** connector removed from the **CARRIAGE P board** on the front loading unit.
3. Set DIP switch pin **SW1-1** located behind the front panel to the ON position.
4. Turn power to the main unit ON.
5. Press the MENU switch located on the sub-panel under the front panel to display the Service Menu.
6. Using the JOG dial, select ***A1: T TORQUE***.
7. Attach the dial torque gauge to the take-up side of the reel block and press the JOG/SHTL button continuously. (The torque gauge should be held firmly and perpendicular to the surface so that it does not push against the reel block.)

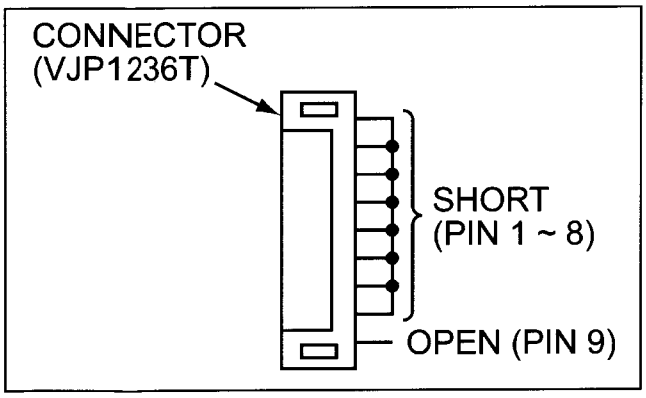


Figure 3-1 Envelope Detection Level Adjustment

8. Read the torque gauge indicator.
9. Turn the JOG dial so that the mean value obtained after repeating steps 7 and 8 five times becomes the Specification, then adjust the torque offset value from the Service Menu.
10. Select ***A2: S TORQUE*** using the JOG dial.
11. Attach the dial torque gauge to the supply side of the reel block and press the JOG/SHTL button continuously.
12. Perform steps 8 through 10 in the same manner as the take-up side.

Refer to ***1-6. Adjusting Tension Arm Offset Voltage*** on page MEC-6 of ***Section 3 Mechanism Adjustments***.

Refer to ***1-8. Confirming and Adjusting Tension Arm PLAY & REV Voltage*** on page MEC-8 of ***Section 3 Mechanism Adjustments***.

4. EQ (H2 / H3 / H4)

This adjustment must be performed after adjustments to the mechanism interface and SERVO P (F1) boards.
Model AJ-D940P should be adjusted in 525 (NTSC) mode and models AJ-D940E and AJ-D940EG should be adjusted in 625 (PAL) mode.
Perform this adjustment after carrying out the following initialization.

Press the **MENU** button to open ***SET-UP MENU***, then enter the following settings:

Menu Name	Setting
012 SYSTEM FORMAT	50M
013 PB FORMAT	MANUAL

4-1. PB L Head Envelope Detection

C.B.A.	EQ (H3)
TP	TP1 (D-1), TP18 (B-3), TP20 (B-3), TP52 (D-1), TP102 (C-1)
ADJ.	Service Menu VR5001 (D-1), VR5301 (C-1)
TAPE	525 (NTSC): VFM3580KM(L) Color Bar Full Field (100%) 625 (PAL): VFM3680KM(L) Color Bar Full Field (100%)
INPUT	-
MODE	PLAY
M. EQ	Oscilloscope
SPEC.	2.5V±0.1V 2.1V±0.05V

1. Extend the H3 P board using the extension board and connect the oscilloscope to **TP18** and **TP1**.
2. Play the alignment tape.
3. Open C00 EQ2 ADJUST in the Service Menu.
4. Set C35: ATF HEAD in the Service Menu to **PBL13**.
5. Adjust C05: RF MAG PBL1 and C06: RF MAG PBL3 in the Service Menu until DC voltage **A** of **TP18** (*Figure 4-1*) reaches the Specification of **2.5V ±0.1V**.

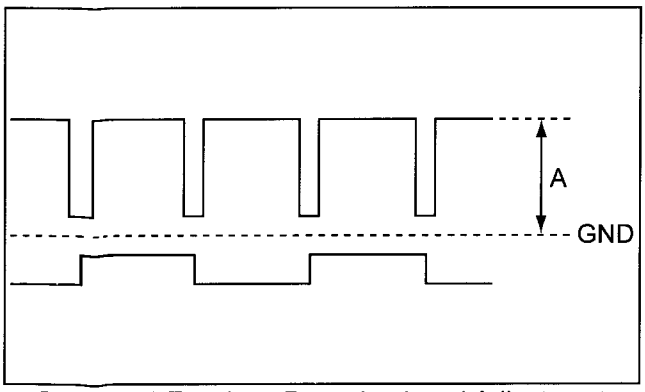


Figure 4-1 Envelope Detection Level Adjustment

6. Connect the oscilloscope to **TP52**.
7. Adjust **VR1** until the DC voltage value of **TP52** reaches the Specification of **2.1V±0.05V**.
8. Connect the oscilloscope to **TP20**.
9. Set C35: ATF HEAD in the menu to **PBL24**.
10. Adjust C07: RF MAG PBL2 and C08: RF MAG PBL4 in the Service Menu until the DC voltage of **TP20** reaches the Specification of **2.5V±0.1V**.
11. Connect the oscilloscope to TP102.
12. Adjust **VR301 (B VCO)** until the DC voltage value of **TP102** reaches the Specification of **2.1V±0.05V**.
13. Press the **SET** button on the front of the Unit and press the **MENU** button twice to close the menu.
14. Return the H3 P board (EQ2) to its original position.

C.B.A.	EQ (H4)
TP	TP1 (D-1), TP18 (B-3), TP20 (B-3), TP52 (D-1), TP102 (C-1)
ADJ.	Service Menu VR5001 (D-1), VR5301 (C-1)
TAPE	525 (NTSC): VFM3580KM(L) Color Bar Full Field (100%) 625 (PAL): VFM3680KM(L) Color Bar Full Field (100%)
INPUT	-
MODE	PLAY
M. EQ	Oscilloscope
SPEC.	2.5V±0.1V 2.1V±0.05V

1. Extend the H4 P board using the extension board and connect the oscilloscope to **TP18** and **TP1**.
2. Play the alignment tape.
3. Open [D00 EQ3 ADJUST] in the Service Menu.
4. Set [D35: ATF HEAD] in the Service Menu to **PBL13**.
5. Adjust [D05: RF MAG PBR1] and [D06: RF MAG PBR3] in the Service Menu until DC voltage **A** of **TP18** (*Figure 4-1*) reaches the Specification of **2.5V ±0.1V**.
6. Connect the oscilloscope to **TP52**.
7. Adjust **VR1 (A VCO)** until the DC voltage of TP52 reaches the Specification of **2.1V±0.05V**.
8. Connect the oscilloscope to TP20.
9. Set [D35: ATF HEAD] in the menu to **PBL24**.
10. Adjust [D07: RF MAG PBR2] and [D08: RF MAG PBR4] in the Service Menu until the DC voltage of **TP20** reaches the specification of **2.5V±0.1V**.
11. Connect the oscilloscope to **TP102**.
12. Adjust **VR301 (B VCO)** until the DC voltage of **TP102** reaches the specification of 2.1V±0.05V.
13. Press the **SET** button on the front and press the **MENU** button twice to close the menu.
14. Return the H4 P board (EQ2) to its original position.

C.B.A.	EQ (H2)
TP	TP1 (D-1), TP18 (B-3), TP20 (B-3), TP52 (D-1), TP102 (C-1)
ADJ.	Service Menu VR5001 (D-1), VR5301 (C-1)
TAPE	525 (NTSC): VFM3580KM(L) Color Bar Full Field (100%) 625 (PAL): VFM3680KM(L) Color Bar Full Field (100%)
INPUT	-
MODE	PLAY
M. EQ	Oscilloscope
SPEC.	2.5V±0.1V 2.1V±0.05V

1. Extend the H2 P board using the extension board and connect the oscilloscope to **TP18** and **TP1**.
2. Play the alignment tape.
3. Open [B00 EQ1 ADJUST] in the Service Menu.
4. Set [B35: ATF HEAD] in the Service Menu to **DVL**.
5. Adjust [B05: RF MAG DVL1] and [B06: RF MAG DVL2] in the Service Menu until DC voltage **A** of **TP18** (*Figure 4-1*) reaches the specification of **2.5V ±0.1V**.
6. Connect the oscilloscope to **TP52**.
7. Adjust **VR1 (A VCO)** until the DC voltage of **TP52** reaches the specification of **2.1V±0.05V**.
8. Connect the oscilloscope to **TP20**.
9. Adjust [B07: RF MAG DVR1] and [B08: RF MAG DVR2] in the Service Menu until the DC voltage of **TP20** reaches the specification of 2.5V±0.1V.
10. Connect the oscilloscope to TP102.
11. Adjust **VR301 (B VCO)** until the DC voltage of **TP102** reaches the specification of 2.1V±0.05V.
12. Press the **SET** button on the front and press the **MENU** button twice to close the menu.
13. Return the H2 P board (EQ1) to its original position.

C.B.A.	EQ (H2)
TP	TP1 (D-1), TP18 (B-3), TP20 (B-3)
ADJ.	Service Menu
TAPE	525 (NTSC): VFM3010EDS 625 (PAL): VFM3110EDS DV alignment tape (color bar)
INPUT	-
MODE	PLAY
M. EQ	Oscilloscope
SPEC.	Refer to *Figure 4-2* and *Figure 4-3*. 2.5V±0.1V

1. Extend the H2 P board using the extension board and connect the oscilloscope to **TP18** and **TP1**.
2. Play the alignment tape.
3. Open [B00 EQ1 ADJUST] in the Service Menu.
4. Set [B35: ATF HEAD] in the Service Menu to **DVL**.
5. Change [B34: TRACKING VAL] in the Service Menu until the waveform of **TP18** appears as in *Figure 4-2*.
6. Adjust [B05: RF MAG DVL1] and [B06: RF MAG DVL2] in the Service Menu until the DC voltage of **TP18** reaches the specification of **2.5V±0.1V**.
7. Connect the oscilloscope to **TP20**.
8. Change [B34: TRACKING VAL] in the Service Menu until the waveform of **TP20** appears as in *Figure 4-2*.
9. Adjust [B07: RF MAG DVR1] and [B08: RF MAG DVR2] in the Service Menu until the DC voltage of **TP20** reaches the specification of **2.5V±0.1V**.
10. Press the **SET** button on the front and press the **MENU** button twice to close the menu.
11. Return the H2 P board (EQ1) to its original position.

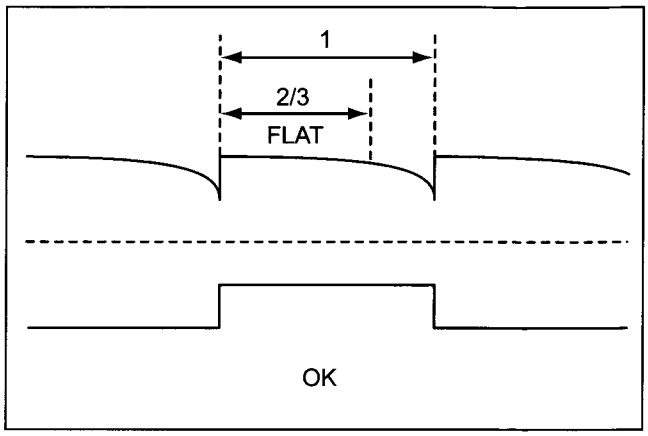


Figure 4-2 Correct Envelope Detection Level Adjustment

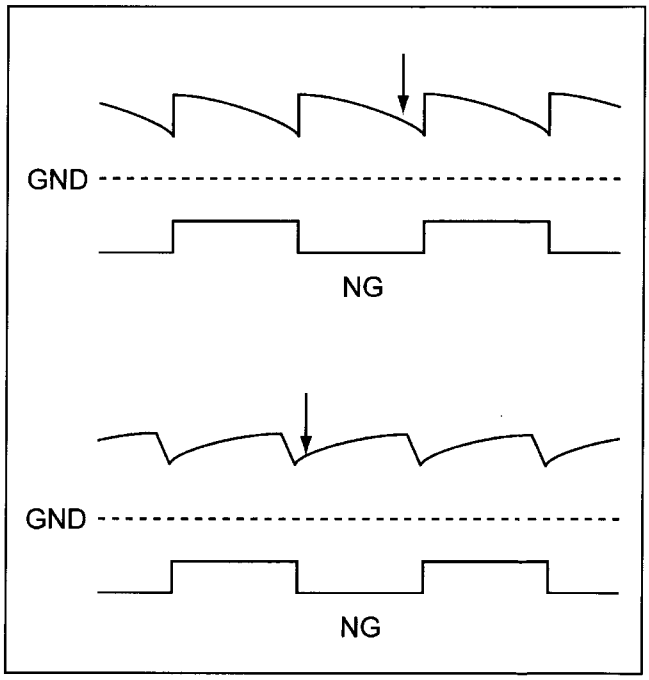


Figure 4-3 Incorrect DV Head Envelope Detection Level Adjustment

C.B.A.	EQ (H2)
TP	TP1 (D-1), TP18 (B-3), TP20 (B-3) TP55 (E-1), TP105 (C-1)
ADJ.	Service Menu
TAPE	525 (NTSC): VFM3010EDS 625 (PAL): VFM3110EDS DV Alignment Tape (Color Bar)
INPUT	-
MODE	PLAY
M. EQ	Oscilloscope
SPEC.	See below.

1. Extend the H2 P board using the extension board and connect the oscilloscope to **TP18** and **TP1**.
2. Play the DV alignment tape.
3. Open [B00 EQ1 ADJUST] in the Service Menu.
4. Set [B35: ATF HEAD] in the Service Menu to **DVL**.
5. Change [B34: TRACKING VAL] in the Service Menu until the waveform of TP18 appears as in *Figure 4-2*.
6. Set [B31: VITERBI MODE] in the Service Menu to **OFF**.
7. Adjust the *Service Menu Adjustment Items* in *Table 4-2* in the order that they are listed, until the error rate of each is minimized. (Error rates are viewed as shown in *Table 4-1*. In this adjustment, as **DVL** is selected as the ATF head in the Service Menu, see the **DVL** row. Note also that error rate minimization refers to the fewest number of LED indicators lit on the audio meter.)

AUDIO METER **ATF HEAD**	**CH1**	**CH2**	**CH3**	**CH4**
PBL13	L1	L3	R1	R3
PBL24	L2	L4	R2	R4
DVL	DV L1	DV L2	DV R1	DV R2

Table 4-1 Error Rate Display

Adjustment Order	**Service Menu Adjustment Item**		**Corresponding Error Rate Display**
1	B01	RF PHS DVL1	DV L1
2	B02	RF PHS DVL2	DV L2
3	B09	PLLPHASE L12	DV L1/L2
4	B10	PLLSLICE L12	DV L1/L2
5	B16	MAIN DL L12	DV L1/L2
6	B11	AEQ L12	DV L1/L2
7	B12	GAIN L1	DV L1
8	B13	PHASE L1	DV L1
9	B14	GAIN L2	DV L2
10	B15	PHASE L2	DV L2
11	B10	PLLSLICE L12	DV L1/L2

Table 4-2 DV Error Rate Adjustment Order (L Head)

8. Connect the oscilloscope to **TP55**.
9. Set [B31: VITERBI MODE] in the Service Menu to **ON**.
10. Adjust [B09: PLLPHASE L12] in the Service Menu until the High/Low ratio (i.e., the Duty) of the **TP55** waveform is approximately 50%, as shown in *Figure 4-4*.

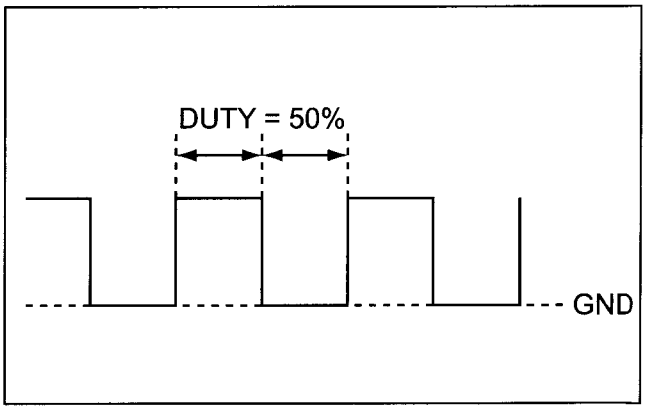


Figure 4-4 PLL Phase Adjustment (L Head)

11. Adjust [B17: VTB GAIN L12] in the Service Menu until the **L1/L2** error rate is minimized.
12. Set [B32: ERROR MODE] in the Service Menu to **SLOW**.
13. Verify that the **L1/L2** error rate is **less than Error Rate Standard Value A**. (The most frequent value during a 20-second measurement is taken as the error rate.)
    For the error rate standard value, refer to ***Section 7 Service Information.***

14. Connect the oscilloscope to **TP20**.
15. Change [B34: TRACKING VAL] in the Service Menu until the waveform of **TP20** appears as in *Figure 4-2*.
16. Set [B31: VITERBI MODE] in the Service Menu to **OFF**.
17. Adjust the *Service Menu Adjustment Items* in *Table 4-3* in the order that they are listed, until the error rate of each is minimized. (Error rates are viewed as shown in *Table 4-1*. In this adjustment, as **DVL** is selected as the ATF head in the Service Menu, see the **DVL** row. Note also that error rate minimization refers to the fewest number of LED indicators lit on the audio meter.)

Adjustment Order	Service Menu Adjustment Item		Corresponding Error Rate Display
1	B03	RF PHS DVR1	DV R1
2	B04	RF PHS DVR2	DV R2
3	B18	PLLPHASE R12	DV R1/R2
4	B19	PLLSLICE R12	DV R1/R2
5	B25	MAIN DL R12	DV R1/R2
6	B20	AEQ R12	DV R1/R2
7	B21	GAIN R1	DV R1
8	B22	PHASE R1	DV R1
9	B23	GAIN R2	DV R2
10	B24	PHASE R2	DV R2
11	B19	PLLSLICE R12	DV R1/R2

Table 4-3 DV Error Rate Adjustment Order (R Head)

18. Connect the oscilloscope to **TP105**.
19. Set [B31: VITERBI MODE] in the Service Menu to **ON**.
20. Adjust [B18: PLLPHASE R12] in the Service Menu until the High/Low ratio (i.e., the Duty) of the **TP105** waveform is approximately 50%, as shown in *Table 4-3*.

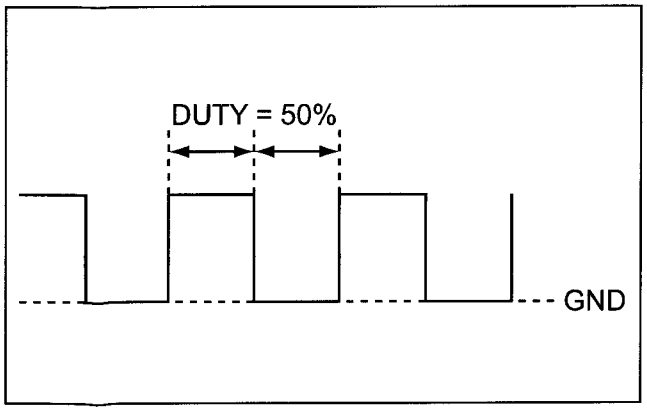


Figure 4-5 PLL Phase Adjustment (R Head)

21. Adjust [B26: VTB GAIN R12] in the Service Menu until the **R1/R2** error rate is minimized.
22. Set [B32: ERROR MODE] in the Service Menu to **SLOW**.
23. Verify that the **R1/R2** error rate is **less than Error Rate Standard Value A.** (The most frequent value during a 20-second measurement is taken as the error rate.)
    For the error rate standard value, refer to ***Section 7 Service Information.***
24. Select [B37: DEFAULT] in the menu (press **SET** button) followed by ***SAVE***.
25. Press the **SET** button on the front and press the **MENU** button to close the menu.
26. Return the H2 P board (EQ1) to its original position.

C.B.A.	EQ (H2)
TP	TP1 (D-1), TP55 (E-1), TP105 (C-1)
ADJ.	Service Menu
TAPE	525 (NTSC): VFM3580KM(L) Color Bar Full Field (100%) 625 (PAL): VFM3680KM(L) Color Bar Full Field (100%)
INPUT	-
MODE	PLAY
M. EQ	Oscilloscope
SPEC.	See below.

1. Play the DVCPRO alignment tape.
2. Open [B00 EQ1 ADJUST] in the Service Menu.
3. Set [B35: ATF HEAD] in the Service Menu to **DVL**.
4. Set [B31: VITERBI MODE] in the Service Menu to **OFF**.
5. Adjust the *Service Menu Adjustment Items* in *Table 4-4* in the order that they are listed, until the error rate of each is minimized. (Error rates are viewed as shown in *Table 4-1*. In this adjustment, as **DVL** is selected as the ATF head in the Service Menu, see the **DVL** row. Note also that error rate minimization refers to the fewest number of LED indicators lit on the audio meter.)

Adjustment Order	Service Menu Adjustment Item		Corresponding Error Rate Display
1	B01	RF PHS DVL1	DV L1
2	B02	RF PHS DVL2	DV L2
3	B09	PLLPHASE L12	DV L1/L2
4	B10	PLLSLICE L12	DV L1/L2
5	B16	MAIN DL L12	DV L1/L2
6	B11	AEQ L12	DV L1/L2
7	B12	GAIN L1	DV L1
8	B13	PHASE L1	DV L1
9	B14	GAIN L2	DV L2
10	B15	PHASE L2	DV L2
11	B10	PLLSLICE L12	DV L1/L2

Table 4-4 DVCPRO Mode DV Error Rate (L Head)

6. Connect the oscilloscope to **TP55**.
7. Set [B31: VITERBI MODE] in the Service Menu to **ON**.
8. Adjust [B09: PLLPHASE L12] in the Service Menu until the High/Low ratio (i.e., the Duty) of the **TP55** waveform is approximately 50%, as shown in *Figure 4-4*.
9. Adjust [B17: VTB GAIN L12] in the Service Menu until the **L1/L2** error rate is minimized.
10. Set [B32: ERROR MODE] in the Service Menu to **SLOW**.
11. Verify that the **L1/L2** error rate is **less than Error Rate Standard Value A**. (The most frequent value during a 20-second measurement is taken as the error rate.)
    For the error rate standard value, refer to ***Section 7 Service Information.***
12. Set [B31: VITERBI MODE] in the Service Menu to **OFF**.
13. Adjust the *Service Menu Adjustment Items* in *Table 4-5* in the order that they are listed, until the error rate of each is minimized. (Error rates are viewed as shown in *Table 4-1*. In this adjustment, as **DVL** is selected as the ATF head in the Service Menu, see the **DVL** row. Note also that error rate minimization refers to the fewest number of LED indictors lit on the audio meter.)

Adjustment Order	Service Menu Adjustment Item		Corresponding Error Rate Display
1	B03	RF PHS DVR1	DV R1
2	B04	RF PHS DVR2	DV R2
3	B18	PLLPHASE R12	DV R1/R2
4	B19	PLLSLICE R12	DV R1/R2
5	B25	MAIN DL R12	DV R1/R2
6	B20	AEQ R12	DV R1/R2
7	B21	GAIN R1	DV R1
8	B22	PHASE R1	DV R1
9	B23	GAIN R2	DV R2
10	B24	PHASE R2	DV R2
11	B19	PLLSLICE R12	DV R1/R2

Table 4-5 DVCPRO Mode DV Error Rate (R Head)

14. Connect the oscilloscope to **TP105**.
15. Set [B31: VITERBI MODE] in the Service Menu to **ON**.
16. Adjust [B18: PLLPHASE R12] in the Service Menu until the High/Low ratio (i.e., the Duty) of the TP105 waveform is approximately 50%, as shown in *Table 4-3*.
17. Adjust [B26: VTB GAIN R12] in the Service Menu until the **R1/R2** error rate is minimized.
18. Set [B32: ERROR MODE] in the Service Menu to **SLOW**.
19. Verify that the **R1/R2** error rate is **less than Error Rate Standard Value A**. (The most frequent value during a 20-second measurement is taken as the error rate.)
    For the error rate standard value, refer to ***Section 7 Service Information.***
20. Select [B37: DEFAULT] in the menu (press **SET** button) followed by ***SAVE***.
21. Press the **SET** button on the front and press the **MENU** button to close the menu.

DVCPRO Mode PB-L Head EQ Alignment and Error Rate Confirmation

C.B.A.	EQ (H3)
TP	TP1 (D-1), TP55 (E-1), TP105 (C-1)
ADJ.	Service Menu
TAPE	525 (NTSC): VFM3580KM(L) Color Bar Full Field (100%) 625 (PAL): VFM3680KM(L) Color Bar Full Field (100%)
INPUT	-
MODE	PLAY
M. EQ	Oscilloscope
SPEC.	See below.

1. Play the DVCPRO alignment tape.
2. Open [C00 EQ2 ADJUST] in the Service Menu.
3. Set [C35: ATF HEAD] in the Service Menu to **PBL13**.
4. Set [C31: VITERBI MODE] in the Service Menu to **OFF**.
5. Adjust the *Service Menu Adjustment Items* in *Table 4-6* in the order that they are listed, until the error rate of each is minimized.(Error rates are viewed as shown in *Table 4-1*. In this adjustment, as **PBL13** is selected as the ATF head in the Service Menu, see the **PBL13** row. Note also that error rate minimization refers to the fewest number of **LED** indicators lit on the audio meter.)

Adjustment Order	Service Menu Adjustment Item		Corresponding Error Rate Display
1	C01	RF PHS DVL1	L1
2	C02	RF PHS DVL3	L3
3	C09	PLLPHASE L13	L1/L3
4	C10	PLLSLICE L13	L1/L3
5	C16	MAIN DL L13	L1/L3
6	C11	AEQ L13	L1/L3
7	C12	GAIN L1	L1
8	C13	PHASE L1	L1
9	C14	GAIN L3	L3
10	C15	PHASE L3	L3
11	C10	PLLSLICE L13	L1/L3

Table 4-6 DVCPRO Mode PB-L Head Error Rate 1

6. Connect the oscilloscope to **TP55**.
7. Set [C31: VITERBI MODE] in the Service Menu to **ON**.
8. Adjust [C09: PLLPHASE L13] in the Service Menu until the High/Low ratio (i.e., the Duty) of the **TP55** waveform is approximately 50%, as shown in *Figure 4-4*.
9. Adjust [C17: VTB GAIN L13] in the Service Menu until the **L1/L3** error rate is minimized.
10. Set [C32: ERROR MODE] in the Service Menu to **SLOW**.
11. Verify that the **L1/L3** error rate is **less than Error Rate Standard Value A**. (The most frequent value during a 20-second measurement is taken as the error rate.)
    For the error rate standard value, refer to ***Section 7 Service Information.***
12. Set [C35: ATF HEAD] in the Service Menu to **PBL24**.
13. Set [C31: VITERBI MODE] in the Service Menu to **OFF**.
14. Adjust the *Service Menu Adjustment Items* in *Table 4-7* in the order that they are listed, until the error rate of each is minimized. (Error rates are viewed as shown in *Table 4-1*. In this adjustment, as **PBL24** is selected as the ATF head in the Service Menu, see the **PBL24** row. Note also that error rate minimization refers to the fewest number of LED indicators lit on the audio meter.)

Adjustment Order	Service Menu Adjustment Item		Corresponding Error Rate Display
1	C03	RF PHS PBL2	L2
2	C04	RF PHS PBL4	L4
3	C18	PLLPHASE L24	L2/L4
4	C19	PLLSLICE L24	L2/L4
5	C25	MAIN DL L24	L2/L4
6	C20	AEQ L24	L2/L4
7	C21	GAIN L2	L2
8	C22	PHASE L2	L2
9	C23	GAIN L4	L4
10	C24	PHASE L4	L4
11	C19	PLLSLICE L24	L2/L4

Table 4-7 DVCPRO Mode PB-L Head Error Rate 2

15. Connect the oscilloscope to **TP105**.
16. Set [C31: VITERBI MODE] in the Service Menu to **ON**.
17. Adjust [C18: PLLPHASE L24] in the Service Menu until the High/Low ratio (i.e., the Duty) of the **TP105** waveform is approximately 50%, as shown in *Figure 4-4*.
18. Adjust [C26: VTB GAIN L24] in the Service Menu until the **L2/L4** error rate is minimized.
19. Set [C32: ERROR MODE] in the Service Menu to **SLOW**.
20. Verify that the **L2/L4** error rate is **less than Error Rate Standard Value A**. (The most frequent value during a 20-second measurement is taken as the error rate.)
    For the error rate standard value, refer to ***Section 7 Service Information.***
21. Select [C37: DEFAULT] in the menu (press **SET** button) followed by ***SAVE***.
22. Press the **SET** button on the front and press the **MENU** button to close the menu.

DVCPRO Mode PB-R Head EQ and Error Rate

C.B.A.	EQ (H4)
TP	TP1 (D-1), TP55 (E-1), TP105 (C-1)
ADJ.	Service Menu
TAPE	525 (NTSC): VFM3580KM(L) Color Bar Full Field (100%) 625 (PAL): VFM3680KM(L) Color Bar Full Field (100%)
INPUT	-
MODE	PLAY
M. EQ	Oscilloscope
SPEC.	See below.

1. Play the DVCPRO alignment tape.
2. Open [D00 EQ3 ADJUST] in the Service Menu.
3. Set [D35: ATF HEAD] in the Service Menu to **PBL13**.
4. Set [D31: VITERBI MODE] in the Service Menu to **OFF**.
5. Adjust the *Service Menu Adjustment Items* in *Table 4-8* in the order that they are listed, until the error rate of each is minimized. (Error rates are viewed as shown in *Table 4-1*. In this adjustment, as **PBL13** is selected as the ATF head in the Service Menu, see the **PBL13** row. Note also that error rate minimization refers to the fewest number of LED indicators lit on the audio meter.)

Adjustment Order	Service Menu Adjustment Item		Corresponding Error Rate Display
1	D01	RF PHS PBR1	R1
2	D02	RF PHS PBR3	R3
3	D09	PLLPHASE R13	R1/R3
4	D10	PLLSLICE R13	R1/R3
5	D16	MAIN DL R13	R1/R3
6	D11	AEQ R13	R1/R3
7	D12	GAIN R1	R1
8	D13	PHASE R1	R1
9	D14	GAIN R3	R3
10	D15	PHASE R3	R3
11	D10	PLLSLICE R13	R1/R3

Table 4-8 DVCPRO Mode PB-R Head Error Rate 1

6. Connect the oscilloscope to **TP55**.
7. Set [D31: VITERBI MODE] in the Service Menu to **ON**.
8. Adjust [D09: PLLPHASE R13] in the Service Menu until the High/Low ratio (i.e., the Duty) of the TP55 waveform is approximately 50%, as shown in *Figure 4-4*.
9. Adjust [D17: VTB GAIN R13] in the Service Menu until the **R1/R3** error rate is minimized.
10. Set [D32: ERROR MODE] in the Service Menu to **SLOW**.
11. Verify that the **R1/R3** error rate is **less than Error Rate Standard Value A**. (The most frequent value during a 20-second measurement is taken as the error rate.)
    For the error rate standard value, refer to ***Section 7 Service Information.***
12. Set [D35: ATF HEAD] in the Service Menu to **PBL24**.
13. Set [D31: VITERBI MODE] in the Service Menu to **OFF**.
14. Adjust the *Service Menu Adjustment Items* in *Table 4-9* in the order that they are listed, until the error rate of each is minimized. (Error rates are viewed as shown in *Table 4-1*. In this adjustment, as **PBL24** is selected as the ATF head in the Service Menu, see the **PBL24** row. Note also that error rate minimization refers to the fewest number of LED indicators lit on the audio meter.)

Adjustment Order	Service Menu Adjustment Item		Corresponding Error Rate Display
1	D03	RF PHS PBR2	R2
2	D04	RF PHS PBR4	R4
3	D18	PLLPHASE R24	R2/R4
4	D19	PLLSLICE R24	R2/R4
5	D25	MAIN DL R24	R2/R4
6	D20	AEQ R24	R2/R4
7	D21	GAIN R2	R2
8	D22	PHASE R2	R2
9	D23	GAIN R4	R4
10	D24	PHASE R4	R4
11	D19	PLLSLICE R24	R2/R4

Table 4-9 DVCPRO Mode PB-R Head Error Rate 2

15. Connect the oscilloscope to TP105.
16. Set [D31: VITERBI MODE] in the Service Menu to **ON**.
17. Adjust [D18: PLLPHASE R24] in the Service Menu until the High/Low ratio (i.e., the Duty) of the **TP105** waveform is approximately 50%, as shown in *Figure 4-4*.
18. Adjust [D26: VTB GAIN R24] in the Service Menu until the **R2/R4** error rate is minimized.
19. Set [D32: ERROR MODE] in the Service Menu to **SLOW**.
20. Verify that the **R2/R4** error rate is **less than Error Rate Standard Value A**. (The most frequent value during a 20-second measurement is taken as the error rate.)
    For the error rate standard value, refer to ***Section 7 Service Information.***
21. Select [D37: DEFAULT] in the menu (press **SET** button) followed by ***SAVE***.
22. Press the **SET** button on the front and press the **MENU** button to close the menu.

5. V OUT

When adjusting V OUT, make the connections shown in the following diagram. Note also that before making this adjustment, the board should be left in the deck with the power turned ON for at least 15 minutes to warm it up.

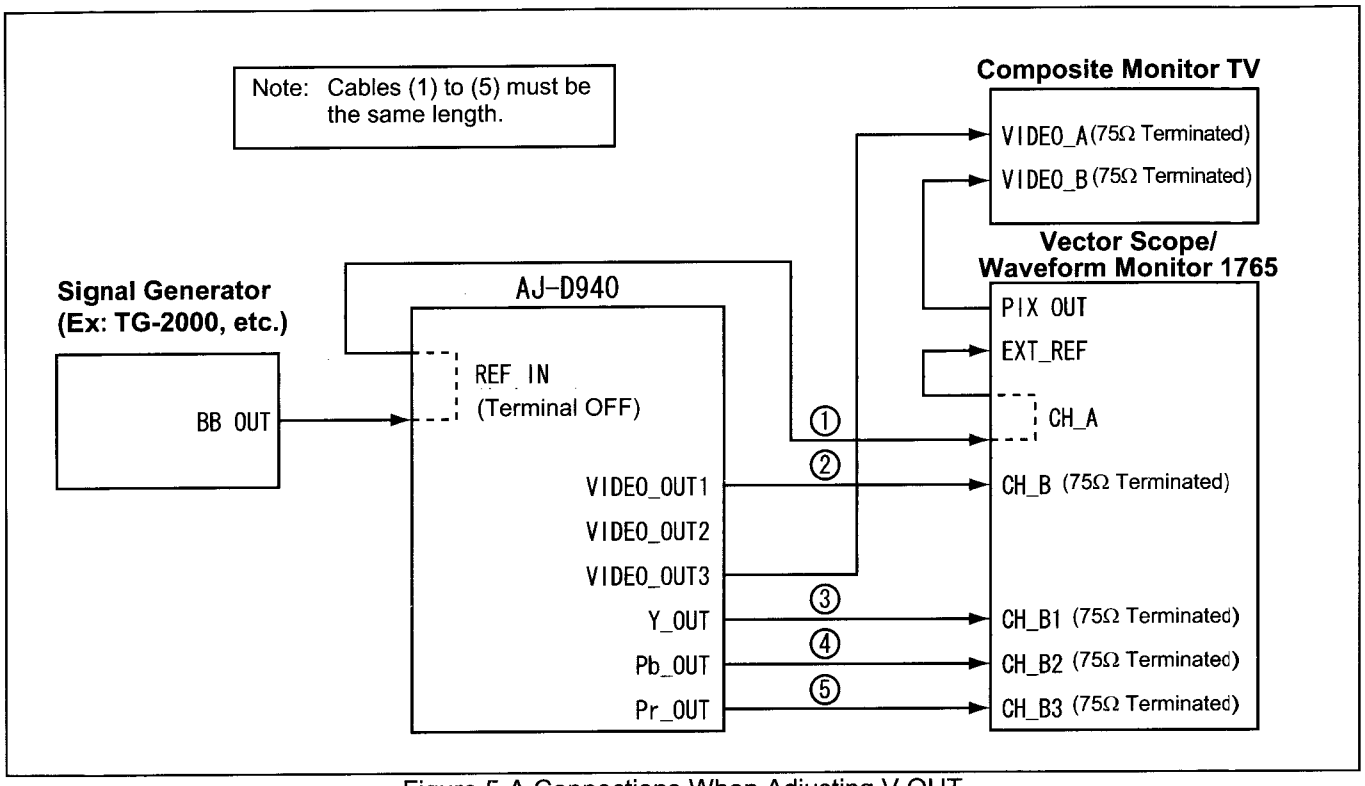


Figure 5-A Connections When Adjusting V OUT

C.B.A.	V OUT (F6)
TP	TP8 (A-4), TP10(B-4)
ADJ.	VR6 (F-3)
TAPE	-
INPUT	Black burst (Ref. In)
MODE	STOP
M. EQ	Oscilloscope
SPEC.	A = B

1. Start the Unit in **525** mode.

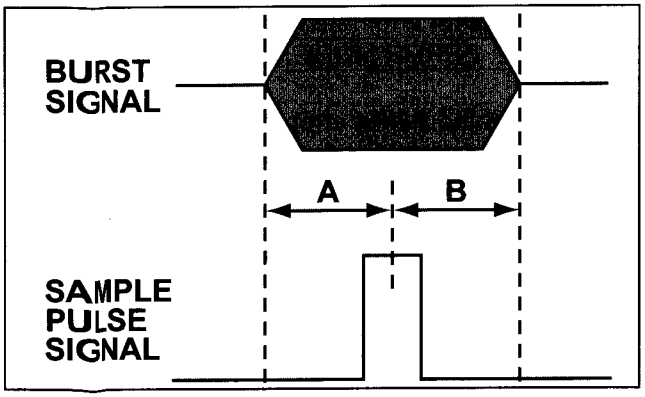


Figure 5-1 Burst Sample Phase Adjustment (525)

2. Connect the oscilloscope to **TP10 (BURST SIGNAL)** and **TP8 (SAMPLE PULSE)**.
3. Adjust **VR6** until the sample pulse at **TP8** is in the center of the burst signal at **TP10**, as shown in *Figure 5-1*.

C.B.A.	V OUT (F6)
TP	TP8 (A-4), TP10(B-4)
ADJ.	VR12 (A-4)
TAPE	-
INPUT	Black burst (Ref. In)
MODE	STOP
M. EQ	Oscilloscope
SPEC.	A = B

1. Start the Unit in **625** mode.
2. Connect oscilloscope to **TP10 (BURST SIGNAL)** and **TP8 (SAMPLE PULSE)**.
3. Adjust **VR12** until the sample pulse at **TP8** is in the center of the burst signal at **TP10**, as shown in *Figure 5-1*.

C.B.A.	V OUT (F6)
TP	TP13 (B-2)
ADJ.	VC1 (B-1)
TAPE	-
INPUT	Black burst (Ref. In)
MODE	STOP
M. EQ	Oscilloscope
SPEC.	A = 0V±0.1V (DC)

1. Start the Unit in **525** mode.
2. Connect the oscilloscope to **TP13**.
3. Adjust **VC1** until DC level **A** of **TP13** is **within the range 0V±0.1V (DC)**, as shown in *Figure 5-2*.

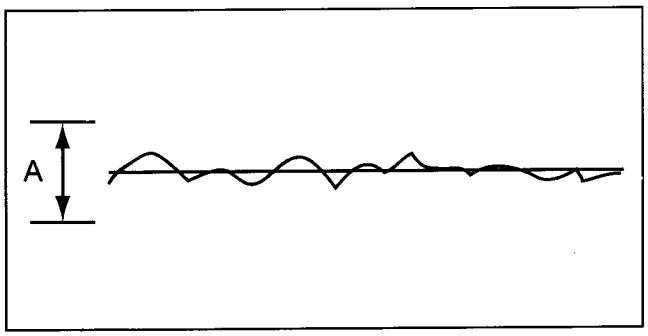


Figure 5-2 4fsc PLL Center Frequency Adjustment (525)

C.B.A.	V OUT (F6)
TP	TP11 (B-1)
ADJ.	VC2 (B-1)
TAPE	-
INPUT	Black burst (Ref. In)
MODE	STOP
M. EQ	Oscilloscope
SPEC.	A=0V±0.1V (DC)

1. Start the Unit in **625** mode.
2. Connect the oscilloscope to **TP11**.
3. Adjust VC2 until the DC level **A** of **TP11** is within the range **0V±0.1V (DC)**, as shown in *Figure 5-2*.

C.B.A.	V OUT (F6)
TP	TP4 (B-1)
ADJ.	VR7 (A-3)
TAPE	-
INPUT	Black burst (Ref. In)
MODE	STOP
M. EQ	Oscilloscope
SPEC.	See *Figure 5-4*.

1. Start the Unit in **525** mode.
2. Connect the Unit, the signal generator, and the oscilloscope as shown in *Figure 5-3*.
3. Turn **VR7** to the left as far as possible, then turn it slowly back to the right.
4. Stop turning when the phase of the CF signal from the signal generator (SG) matches that of the CF signal of **TP4**, as shown in *Figure 5-4*.

<NOTE>

Use an oscilloscope that can measure signals of 100 MHz or greater.

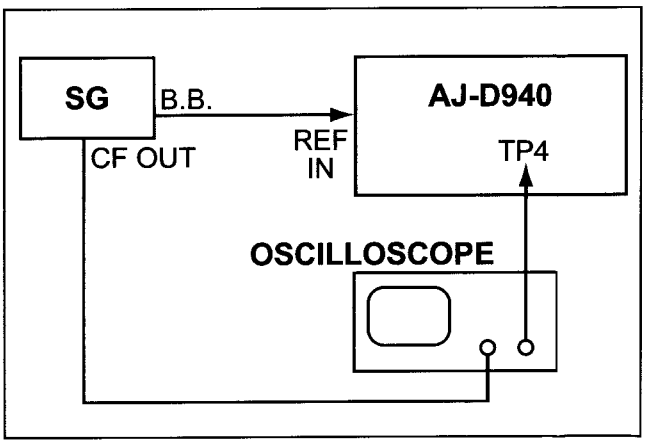


Figure 5-3 CF Phase Adjustment (1) Connection

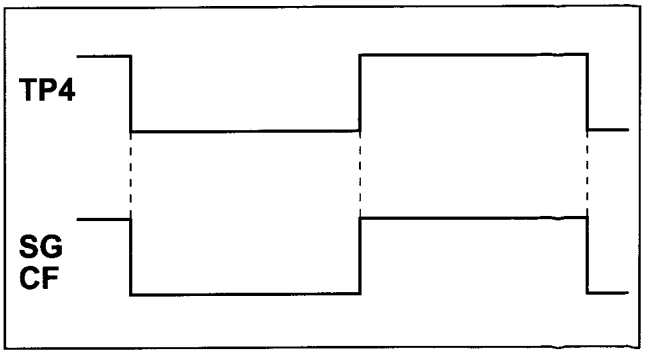


Figure 5-4 CF Phase Adjustment (1)

C.B.A.	V OUT (F6)
TP	TP1, TP2 (B-1)
ADJ.	VR7 (A-3)
TAPE	-
INPUT	Black burst (Ref. In)
MODE	STOP (E-E)
M. EQ	Oscilloscope
SPEC.	A = B

1. Start the Unit in **525** mode.
2. Connect the Unit, the signal generator, and the oscilloscope as shown in *Figure 5-3*.
3. Place the oscilloscope in **CHOP** mode, then use the trigger during the fall of **TP2** and expand the peak section.

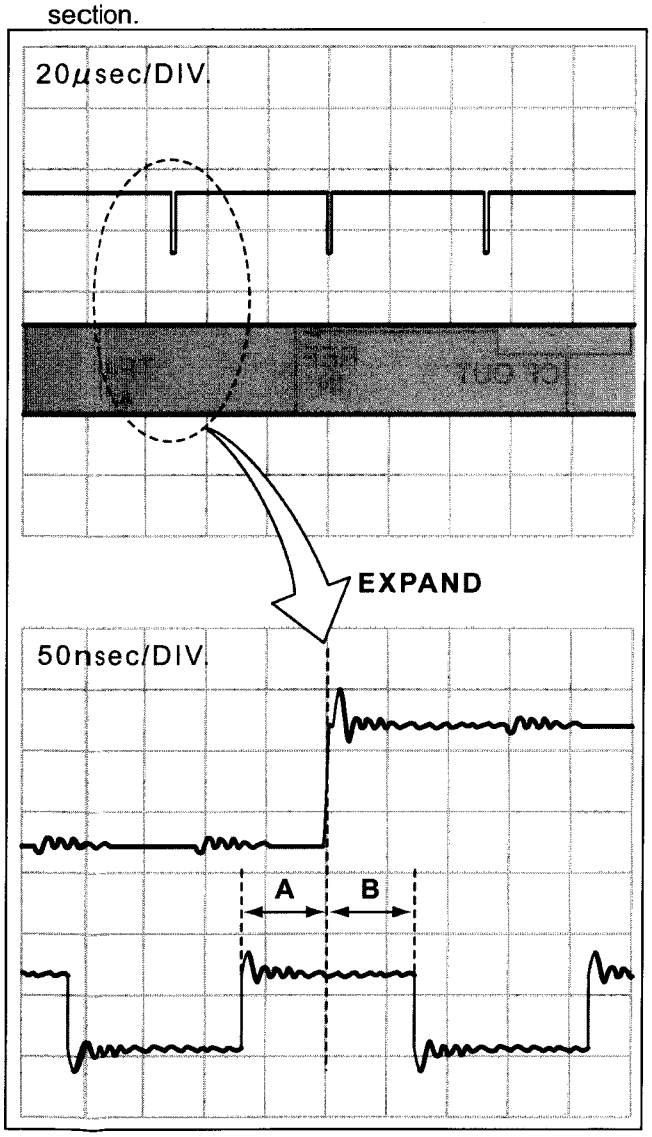


Figure 5-5 CF Phase Adjustment (2)

4. Adjust until the **TP2** pulse onset occurs at the point where **A=B**, as shown in *Figure 5-5*.

C.B.A.	V OUT (F6)
TP	TP4 (B-1), TP7 (B-4)
ADJ.	VR13 (A-3)
TAPE	-
INPUT	Black burst (Ref. In)
MODE	STOP (E-E)
M. EQ	Oscilloscope
SPEC.	See *Figure 5-6*.

1. Start the Unit in **625** mode.
2. Turn **VR13** to the left as far as possible, then turn it slowly back to the right.
3. Stop turning when the CF Flag of **TP7** matches the **TP4** CF signal rise, as shown in *Figure 5-6*.

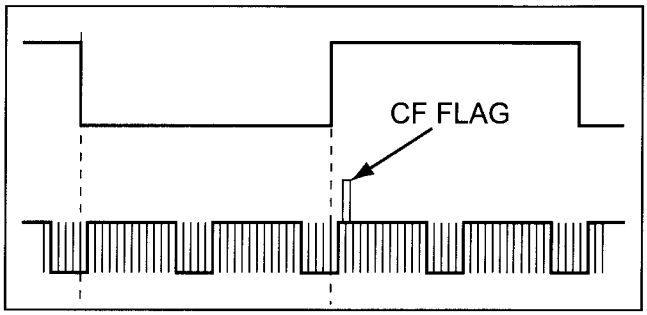


Figure 5-6 CF Phase Adjustment (1) (625)

C.B.A.	V OUT (F6)
TP	TP1, TP2 (B-1)
ADJ.	VR13 (A-3)
TAPE	-
INPUT	Black burst (Ref. In)
MODE	STOP
M. EQ	Oscilloscope
SPEC.	See *Figure 5-7*.

1. Start the Unit in **625** mode.
2. Adjust **VR13** so that the pulse at **TP2** is in the center of the high period of signal at **TP1** as shown in *Figure 5-7*.

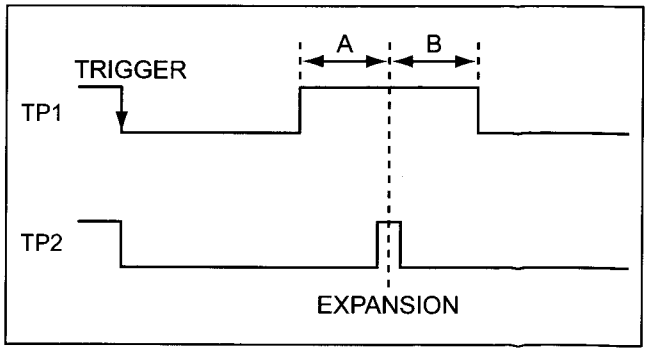


Figure 5-7 CF Phase Adjustment (2) (625)

C.B.A.	V OUT (F6)
TP	VIDEO OUT 1 (75Ω)
ADJ.	VR2 (I-1)
TAPE	525 (NTSC): VFM3380KM Color Bar Full Field (100%) 625 (PAL): VFM3480KM Color Bar Full Field (100%)
INPUT	-
MODE	PLAY
M. EQ	Waveform monitor
SPEC.	525 (NTSC): A=714mV±5mV 625 (PAL): A=700mV±5mV

<NOTE>

- Do not use an extension board when making adjustments.
- Model **AJ-D940P** should be adjusted in **525 (NTSC)** mode and models **AJ-D940E and AJ-D940EG** should be adjusted in **625 (PAL)** mode.

1. For NTSC, **VR2** is adjusted until video level **A** is **714mV ± 5mV**, as shown in *Figure 5-8*. For PAL, **VR2** is adjusted until video level **A** is **700mV±5mV**, as shown in *Figure 5-9*.

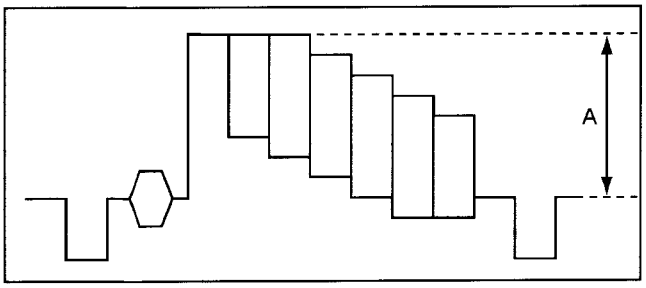


Figure 5-8 Output Level of Composite Signal Adjustment

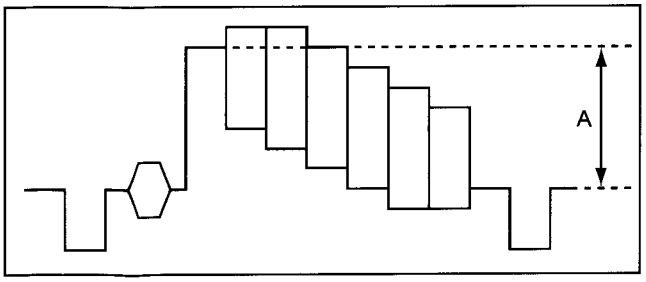


Figure 5-9 Output Level of Composite Signal Adjustment

C.B.A.	V OUT (F6)
TP	VIDEO OUT 1 (75Ω)
ADJ.	VR19 (I-3)
TAPE	525 (NTSC): VFM3380KM Color Bar Full Field (100%) 625 (PAL): VFM3480KM Color Bar Full Field (100%)
INPUT	-
MODE	PLAY
M. EQ	Waveform monitor
SPEC.	525 (NTSC): A=286mV±3mV 625 (PAL): A=300mV±3mV

<NOTE>

- Do not use an extension board when making adjustments.
- Model **AJ-D940P** should be adjusted in **525 (NTSC)** mode and models **AJ-D940E and AJ-D940EG** should be adjusted in **625 (PAL)** mode.

1. For NTSC, VR19 is adjusted until Sync level **A** is **286mV±3mV**, and for PAL, **VR19** is adjusted until Sync level **A** is **300mV±3mV**, as shown in *Figure 5-10*.

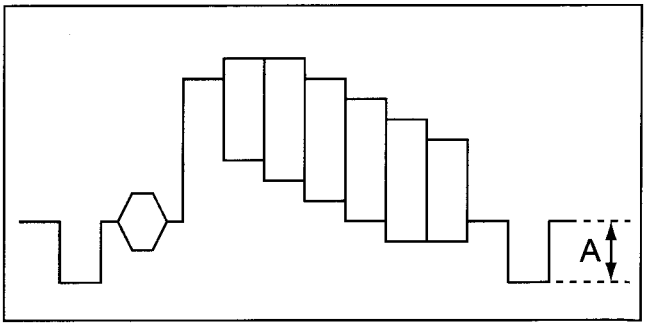


Figure 5-10 Sink Level of Composite Signal Adjustment

C.B.A.	V OUT (F6)
TP	VIDEO OUT 1 (75Ω)
ADJ.	525 (NTSC): VR20 (I-4) 625 (PAL): VR21 (H-4)
TAPE	525 (NTSC): VFM3380KM Color Bar Full Field (100%) 625 (PAL): VFM3480KM Color Bar Full Field (100%)
INPUT	-
MODE	PLAY
M. EQ	Waveform monitor
SPEC.	See *Figure 5-11.*

<NOTE>

- Do not use an extension board when making adjustments.
- Model **AJ-D940P** should be adjusted in **525 (NTSC)** mode and models **AJ-D940E and AJ-D940EG** should be adjusted in **625 (PAL)** mode.
- With models designed for North America, **01 CMPST OUT** of **623 SETUP50** in the user menu is set to **0001 ADD**.

1. To align the reference level of the Sync section with the pedestal section as indicated by **A** in *Figure 5-11*, **VR20** is adjusted in NTSC mode and **VR21** is adjusted in PAL mode.

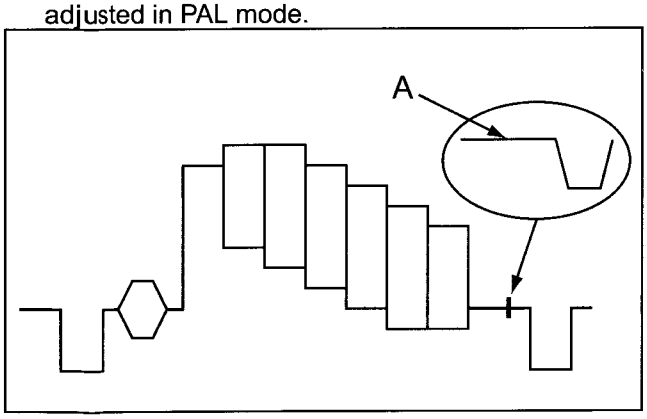


Figure 5-11 Sink Offset Level of Composite Signal Adjustment

C.B.A.	V OUT (F6)
TP	VIDEO OUT 3
ADJ.	VR1 (I-3)
TAPE	525 (NTSC): VFM3380KM Color Bar Full Field (100%) 625 (PAL): VFM3480KM Color Bar Full Field (100%)
INPUT	-
MODE	PLAY
M. EQ	Waveform monitor
SPEC.	See *Figure 5-12.*

<NOTE>

- Do not use an extension board when making adjustments.
- Model **AJ-D940P** should be adjusted in **525 (NTSC)** mode and models **AJ-D940E and AJ-D940EG** should be adjusted in **625 (PAL)** mode.

1. Press the **MENU** button located on the bottom of the front panel to display characters on the monitor screen.
2. Adjust **VR1** until the black level of the characters is aligned with pedestal section, as shown in *Figure 5-12.*

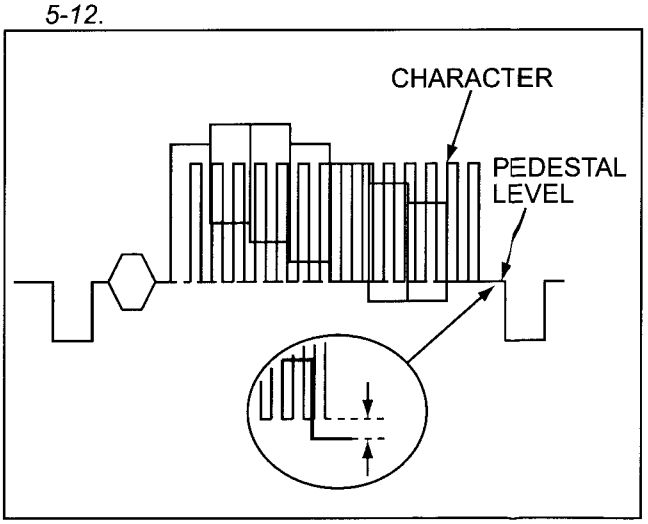


Figure 5-12 Output DC Level of Composite Signal Adjustment

C.B.A.	V OUT (F6)
TP	VIDEO OUT 1 (75Ω)
ADJ.	VR25 (I-3)
TAPE	525 (NTSC): VFM3380KM Color Bar Full Field (100%) 625 (PAL): VFM3480KM Color Bar Full Field (100%)
INPUT	-
MODE	PLAY
M. EQ	Waveform monitor
SPEC.	525 (NTSC): A=286mV±3mV 625 (PAL): A=300mV±3mV

<NOTE>

- Do not use an extension board when making adjustments.
- Model **AJ-D940P** should be adjusted in **525 (NTSC)** mode and models **AJ-D940E and AJ-D940EG** should be adjusted in **625 (PAL)** mode.

1. For NTSC, **VR25** is adjusted until burst level **A** is **286mV±3mV**, and for PAL, **VR19** is adjusted until burst level **A** is **300mV±3mV**, as shown in *Figure 5-13*.

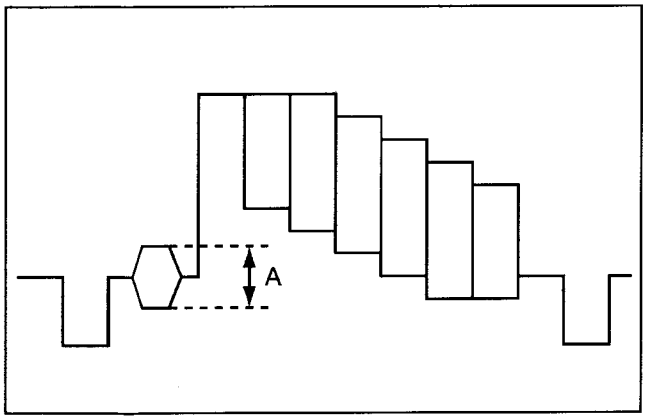


Figure 5-13 Frequency Characteristics of Composite Signal Adjustment

C.B.A.	V OUT (F6)
TP	VIDEO OUT 1 (75Ω)
ADJ.	VR14 (A-1), VR15 (D-1)
TAPE	-
INPUT	Black burst (Ref. In)
MODE	STOP (E-E)
M. EQ	Waveform monitor Vector scope
SPEC.	REF IN & VIDEO OUT 1 phases match.

<NOTE>

- Return the Unit to the factory default mode before adjusting **SYSTEM menu** settings.

1. After verifying that the connections shown in *Figure 5-A Connections When Adjusting V OUT* have been made, start the Unit in **525** mode.
2. Place the vector scope (waveform monitor) in **EXT** mode and align the vector phase (burst) of **CH A** with **180°** (*Figure 5-14*).
3. Turn the vector scope to **CH B** and adjust **VR15** until the vector phase (burst) is the same (**180°**) as that of **CH A** (*Figure 5-14*).

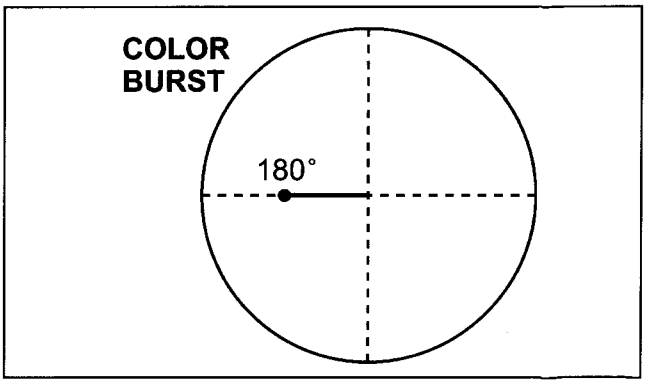


Figure 5-14 Vector Scope (NTSC)

4. Enlarge the H sink section using the waveform monitor and adjust **VR14** until the phases of **CH A** and **CH B** match (*Figure 5-15*).

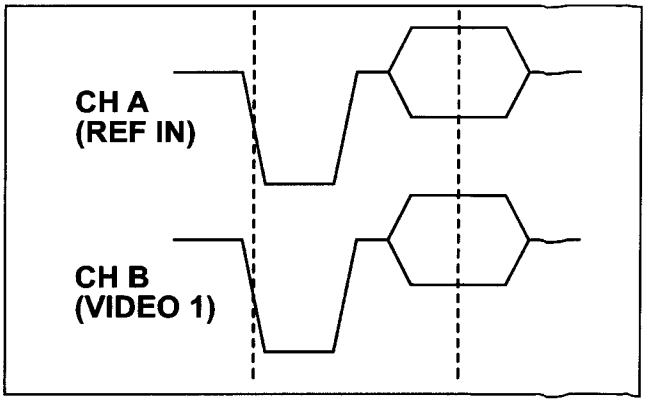


Figure 5-15 Waveform Monitor

C.B.A.	V OUT (F6)
TP	VIDEO OUT 1 (75Ω)
ADJ.	VR4 (A-1), VR16 (D-1)
TAPE	-
INPUT	Black burst (Ref. In)
MODE	STOP (E-E)
M. EQ	Waveform monitor Vector scope
SPEC.	Phases of REF IN and VIDEO OUT 1 match.

<NOTE>

- Return the Unit to the factory default mode before adjusting **SYSTEM menu** settings.

1. After verifying that the connections shown in *Figure 5-A Connections When Adjusting V OUT* have been made, start the Unit in **625** mode.
2. Place the vector scope (waveform monitor) in **EXT** mode and align the vector phase (burst) of **CH A** with **135°** and **225°** (*Figure 5-16*).
3. Apply the vector scope to **CH B** and adjust **VR16** until the vector phase (burst) is identical to that of **CH A** (**135°** and **225°**) (*Figure 5-16*).

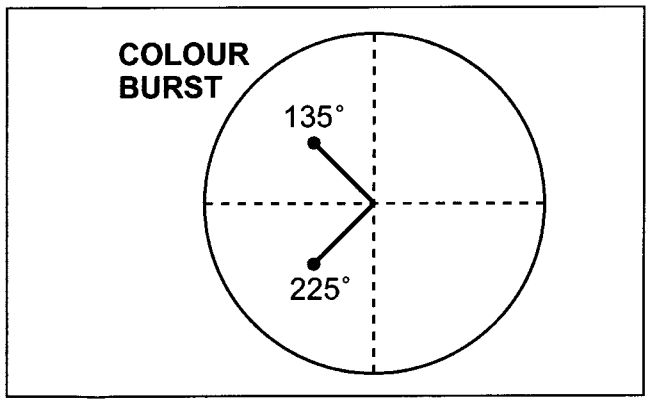


Figure 5-16 Vector Scope (PAL)

4. Enlarge the H sink section using the waveform monitor and adjust **VR4** until the phases of **CH A** and **CH B** match (*Figure 5-15*).

C.B.A.	V OUT (F6) SUB (422 : 844DA)
TP	Y OUT (75Ω)
ADJ.	VR3001 (F-3)
TAPE	525 (NTSC): VFM3380KM Color Bar Full Field (100%) 625 (PAL): VFM3480KM Color Bar Full Field (100%)
INPUT	-
MODE	PLAY
M. EQ	Waveform monitor
SPEC.	525 (NTSC): A=714mV±3mV 625 (PAL): A=700mV±3mV

<NOTE>

- Do not use an extension board when making adjustments.
- Model **AJ-D940P** should be adjusted in **525 (NTSC)** mode and models **AJ-D940E and AJ-D940EG** should be adjusted in **625 (PAL)** mode.
- When adjusting in **525 (NTSC)** mode, set **No.614: Pb/Pr OUT LV** in **SETUP MENU** to **BCAM**.

1. For NTSC, **VR3001** is adjusted until Y level **A** is **714mV±3mV**, and for PAL, VR3001 is adjusted until Y level **A** is **700mV±3mV**, as shown in *Figure 5-14*.

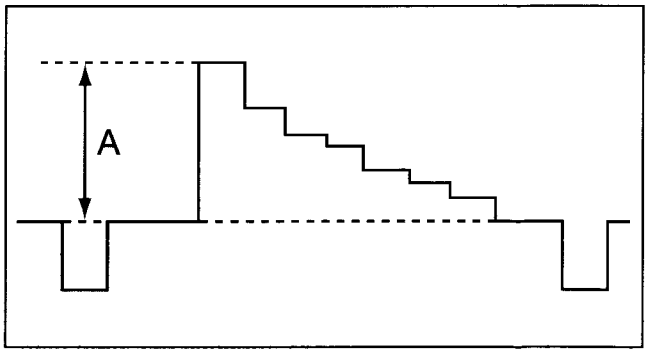


Figure 5-17 Level of Y Component Adjustment

C.B.A.	V OUT (F6) SUB (422 : 844DA)
TP	Y OUT (75Ω)
ADJ.	VR3002 (F-3)
TAPE	525 (NTSC): VFM3380KM 625 (PAL): VFM3480KM H Sweep
INPUT	-
MODE	PLAY
M. EQ	Waveform monitor
SPEC.	A = B –0.5dB

<NOTE>

- Model **AJ-D940P** should be adjusted in **525 (NTSC)** mode and models **AJ-D940E and AJ-D940EG** should be adjusted in **625 (PAL)** mode.

1. Adjust **VR3002** until, as shown in *Figure 5-18*, the frequency properties become flat in the region of **0.5** to **5.75 MHz**. Adjust so that only the middle region does not rise upwards.

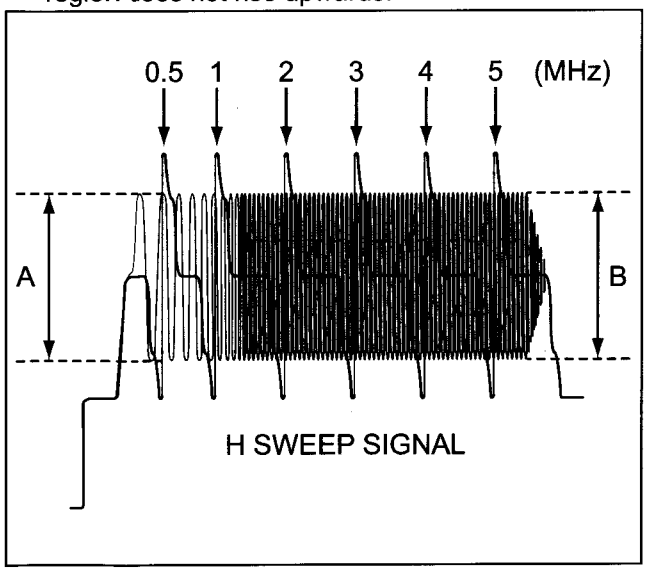


Figure 5-18 Frequency Characteristics of Y Component Adjustment

C.B.A.	V OUT (F6) SUB (422 : 844DA)
TP	Y OUT (75Ω)
ADJ.	VR3013 (G-4)
TAPE	525 (NTSC): VFM3380KM Color Bar Full Field (100%) 625 (PAL): VFM3480KM Color Bar Full Field (100%)
INPUT	-
MODE	PLAY
M. EQ	Waveform monitor
SPEC.	525 (NTSC): A=286mV±5mV 625 (PAL): A=300mV±6mV

<NOTE>

- Model **AJ-D940P** should be adjusted in **525 (NTSC)** mode and models **AJ-D940E and AJ-D940EG** should be adjusted in **625 (PAL)** mode.
- When adjusting in **525 (NTSC)** mode, set **No.614: Pb/Pr OUT LV** in **SETUP MENU** to **BCAM**.

1. For NTSC, VR3013 is adjusted until Y sink level **A** is **286mV±5mV**, and for PAL, **VR3013** is adjusted until Y sink level **A** is **300mV±6mV**, as shown in *Figure 5-19*.

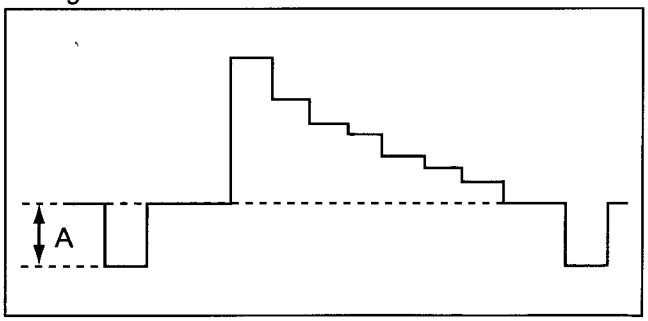


Figure 5-19 Sink Level of Y Component Adjustment

C.B.A.	V OUT (F6) SUB (422 : 844DA)
TP	Pb OUT (75Ω)
ADJ.	VR3006 (G-4)
TAPE	525 (NTSC): VFM3380KM Color Bar Full Field (100%) 625 (PAL): VFM3480KM Color Bar Full Field (100%)
INPUT	-
MODE	PLAY
M. EQ	Waveform monitor
SPEC.	525 (NTSC): A=1009mV±4mV 625 (PAL): A=700mV±3mV

<NOTE>

- Model **AJ-D940P** should be adjusted in **525 (NTSC)** mode and models **AJ-D940E and AJ-D940EG** should be adjusted in **625 (PAL)** mode.
- When adjusting in **525 (NTSC)** mode, set **No.614: Pb/Pr OUT LV** in **SETUP MENU** to **BCAM**.

1. For NTSC, **VR3006** is adjusted until **Pb** level **A** is **1009mV±4mV**, and for PAL, VR3006 is adjusted until Pb level **A** is **700mV ± 3mV**, as shown in *Figure 5-20*.

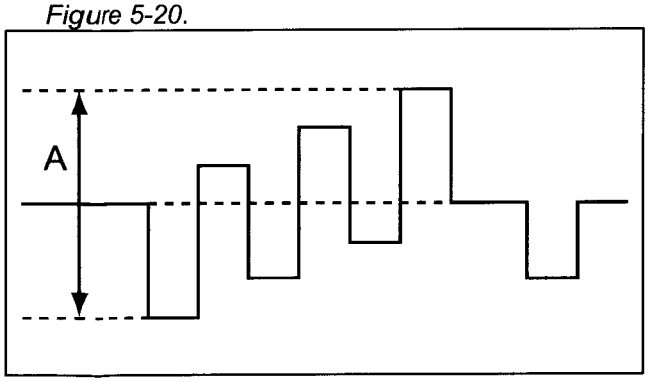


Figure 5-20 Level of Pb Component Adjustment

C.B.A.	V OUT (F6) SUB (422 : 844DA)
TP	Pr OUT (75Ω)
ADJ.	VR3004 (F-1)
TAPE	525 (NTSC): VFM3380KM Color Bar Full Field (100%) 625 (PAL): VFM3480KM Color Bar Full Field (100%)
INPUT	-
MODE	PLAY
M. EQ	Waveform monitor
SPEC.	525 (NTSC): A=1009mV±4mV 625 (PAL): A=700mV±3mV

<NOTE>

- Model **AJ-D940P** should be adjusted in **525 (NTSC)** mode and models **AJ-D940E and AJ-D940EG** should be adjusted in **625 (PAL)** mode.
- When adjusting in **525 (NTSC)** mode, set **No.614: Pb/Pr OUT LV** in **SETUP MENU** to **BCAM**.

1. For NTSC, **VR3004** is adjusted until **Pr** level **A** is **1009mV±4mV**, and for PAL, VR3004 is adjusted until Pr level **A** is **700mV±3mV**, as shown in *Figure 5-21*.

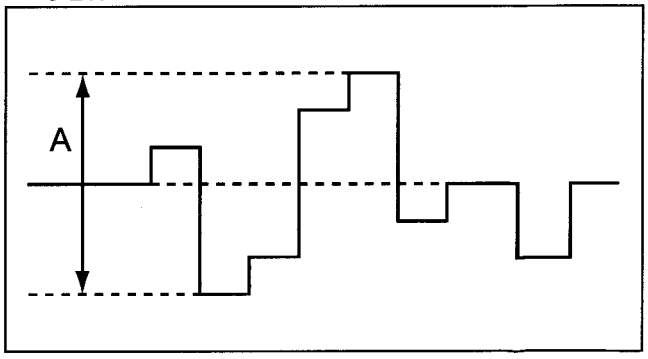


Figure 5-21 Level of Pr Component Adjustment

C.B.A.	V OUT (F6) SUB (422 : 844DA)
TP	Pb OUT (75 Ω)
ADJ.	VR3017 (G-2)
TAPE	525 (NTSC): VFM3380KM 625 (PAL): VFM3480KM H Sweep
INPUT	-
MODE	PLAY
M. EQ	Waveform monitor
SPEC.	A = B –0.5dB

<NOTE>

- Model **AJ-D940P** should be adjusted in **525 (NTSC)** mode and models **AJ-D940E and AJ-D940EG** should be adjusted in **625 (PAL)** mode.

1. Adjust **VR3017** until, as shown in *Figure 5-22*, the frequency characteristics become flat in the region of **0.5** to **2.75 MHz**. Adjust so that only the middle region does not rise upwards.

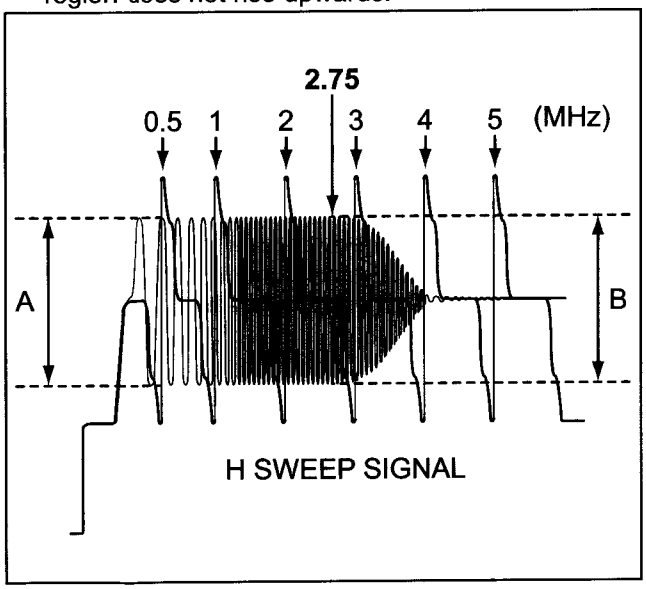


Figure 5-22 Frequency Characteristics of Pb/Pr Components Adjustment

C.B.A.	V OUT (F6) SUB (422 : 844DA)
TP	Pr OUT (75 Ω)
ADJ.	VR3016 (G-2)
TAPE	525 (NTSC): VFM3380KM 625 (PAL): VFM3480KM H Sweep
INPUT	-
MODE	PLAY
M. EQ	Waveform monitor
SPEC.	A = B –0.5dB

<NOTE>

- Model **AJ-D940P** should be adjusted in **525 (NTSC)** mode and models **AJ-D940E and AJ-D940EG** should be adjusted in **625 (PAL)** mode.

1. Adjust **VR3016** until, as shown in *Figure 5-22*, the frequency properties become flat in the region of **0.5** to **2.75 MHz**. Adjust so that only the middle region does not rise upwards.

C.B.A.	V OUT (F6) SUB (422 : 844DA)
TP	Y OUT (75 Ω), Pb OUT (75 Ω)
ADJ.	VR3005 (F-2)
TAPE	525 (NTSC): VFM3380KM 625 (PAL): VFM3480KM Bowtie (500K)
INPUT	-
Mode	PLAY
M. EQ	Waveform monitor
SPEC.	A = B (0±5 ns)

<NOTE>

- Model **AJ-D940P** should be adjusted in **525 (NTSC)** mode and models **AJ-D940E and AJ-D940EG** should be adjusted in **625 (PAL)** mode.

1. After verifying that the connections shown in *Figure 5-A Connections When Adjusting V OUT* have been made, set the waveform monitor to **DIFF (Y/C** Timing) mode, and measure **Y-Pb**.

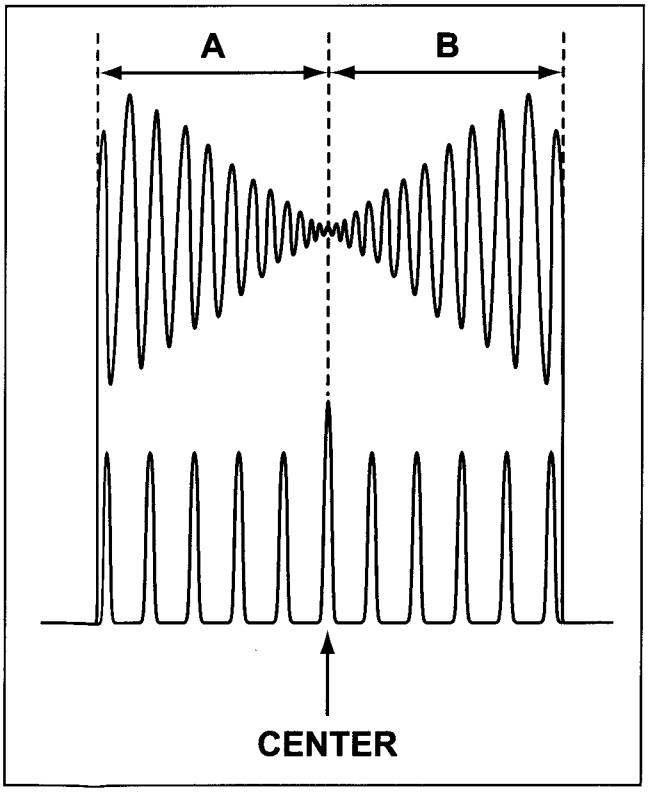


Figure 5-23 Timing of Y-Pb Component Adjustment

<NOTE>

- If there is no Y, Pb or Pr (B1, B2 or B3) input to the waveform monitor, enter the Y signal through **CH-A** and the **Pb** signal through **CH-B**, and set to **DIFF (A-B)** mode.
- Note also that adjustments cannot be made using a waveform monitor that does not have a **DIFF (A-B)** mode. In such cases, an oscilloscope should be used in **ADD** mode **(CH1 + CH2)**, with the Y signal connected to **CH1**, the **Pb** signal connected to **CH2**, and one channel set to inverted (INV).

2. Adjust **VR3005** until the cross-point of the envelope is in the center (i.e., the position indicated by the large marker), as in *Figure 5-23.*

5-24 Timing of Y-Pr Component Adjustment

C.B.A.	V OUT (F6) SUB (422 : 844DA)
TP	Y OUT (75 Ω), Pr OUT (75 Ω)
ADJ.	VR3003 (F-2)
TAPE	525 (NTSC): VFM3380KM 625 (PAL): VFM3480KM Bowtie (500K)
INPUT	-
MODE	PLAY
M. EQ	Waveform monitor
SPEC.	A = B (0±5 ns)

<NOTE>

- Model **AJ-D940P** should be adjusted in **525 (NTSC)** mode and models **AJ-D940E and AJ-D940EG** should be adjusted in **625 (PAL)** mode.

1. After verifying that the connections shown in *Figure 5-A Connections When Adjusting V OUT* have been made, set the waveform monitor to **DIFF (Y/C** Timing) mode, and measure **Y-Pb**.

<NOTE>

- If there is no Y, Pb or Pr (B1, B2 or B3) input to the waveform monitor, enter the Y signal through **CH-A** and the **Pb** signal through **CH-B**, and set to **DIFF (A-B)** mode.
- Note also that adjustments cannot be made using a waveform monitor that does not have a **DIFF (A-B)** mode. In such cases, an oscilloscope should be used in **ADD** mode **(CH1 + CH2)**, with the Y signal connected to **CH1**, the **Pr** signal connected to **CH2**, and one channel set to inverted (INV).

2. Adjust **VR3003** until the cross-point of the envelope is in the center (i.e., the position indicated by the large marker), as in *Figure 5-23.*

6. PB (F5)

This adjustment must be performed after adjusting the V OUT P board (F6).
Note also that this adjustment is performed on all models in 525 (NTSC) mode only (including 625 (PAL) models), irrespective of intended destination.

C.B.A.	PB (F5) SUB (V BLK)
TP	VIDEO OUT 1 (75Ω)
ADJ.	VR2 (D-2) :SUB (V BLK)
TAPE	525 (NTSC): VFM3380KM 625 (PAL): VFM3480KM V-BLANK
INPUT	-
MODE	PLAY
M. EQ	Waveform monitor
SPEC.	See *Figure 6-1.*

<NOTE>

- Make adjustments in **525 (NTSC)** mode, including models **AJ-D940E and AJ-D940EG.**

1. Connect VIDEO OUT 1 to the waveform monitor, and set LINE SEL to **14 lines**.
2. Adjust **VR2** until the setup level is level with the pedestal level (horizontal or straight line), as shown in *Figure 6-1.*

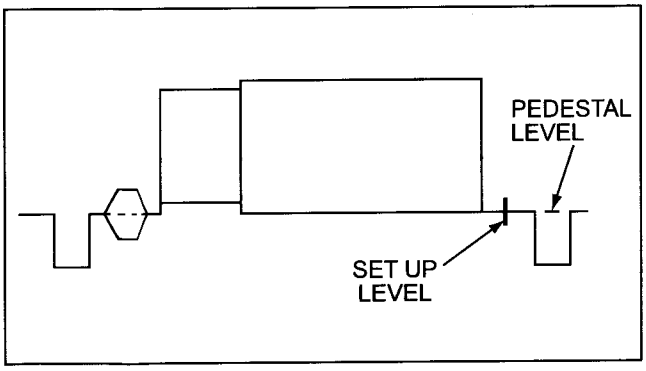


Figure 6-1 Setup of TELETXT Signal Adjustment (NTSC)

C.B.A.	PB (F5) SUB (V BLK)
TP	VIDEO OUT 1 (75Ω)
ADJ.	VR1 (C-2) : SUB (V BLK)
TAPE	525 (NTSC): VFM3380KM 625 (PAL): VFM3480KM V-BLANK
INPUT	-
MODE	PLAY
M. EQ	Waveform monitor
SPEC.	A = 500mV±5mV

<NOTE>

- Make adjustments in **525 (NTSC)** mode, including models **AJ-D940E and AJ-D940EG.**

1. Connect VIDEO OUT 1 to the waveform monitor, and set LINE SEL to **14 lines**.
2. Adjust **VR1** until Level **A** is within the range **500mV ±5mV**, as shown in *Figure 6-2.*

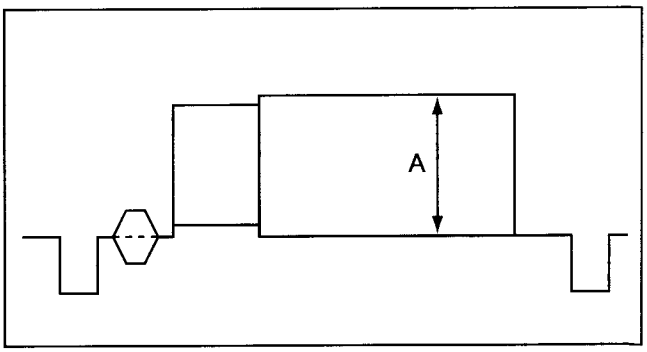


Figure 6-2 Setup of TELETXT Signal Adjustment (NTSC)

7. A ADDA (F8)

Perform this adjustment after making the following initializations.

1. Set Pin 1 of the DIP switch behind the front panel to ON and open the Service Menu
2. Open the ***F00 : AUDIO ADJUST*** menu and enter the following settings:

Item	AJ-D940P	AJ-D940E	AJ-D940EG
F01: REF_LEVEL1	FS-20	FS-18	FS-18
F02: REF_LEVEL2	0dB	0dB	-3dB
F03: REF_LEV_INI	0dB	0dB	0dB

In specifications for Germany (AJ-D940EG), F02: REF_LEVEL2 can be set to -3dB only when F01: REF_LEVEL1 is set to FS-18 beforehand.

3. Close the menu and set pin 1 of the DIP switch to OFF position.
4. Press the **MENU** button and open ***AUDIO*** in the ***SET-UP MENU*** and set as follows:

Menu Name	AJ-D940P/E	AJ-D940EG
706 CH1 OUT LV	0dB	-3dB
707 CH2 OUT LV	0dB	-3dB
708 CH3 OUT LV	0dB	-3dB
709 CH4 OUT LV	0dB	-3dB
711 MONIL OUT LV	0dB	-3dB
712 MONIR OUT LV	0dB	-3dB
713 MONI OUT	VAR	VAR

C.B.A.	A ADDA (F8)
TP	AUDIO OUT : CH1/2/3/4 MONI OUT : L-CH, R-CH
ADJ.	VR402 (CH1)(H-3), VR477 (CH2)(G-3) VR552 (CH3)(B-3), VR627 (CH4)(A-3) VR751 (L-CH)(G-2), VR831 (R-CH)(D-2)
TAPE	525 (NTSC): VFM3380KM 625 (PAL): VFM3480KM 1kHz Ref. Level (Color Bar)
INPUT	-
MODE	PLAY
M. EQ	Oscilloscope
SPEC.	Minimized

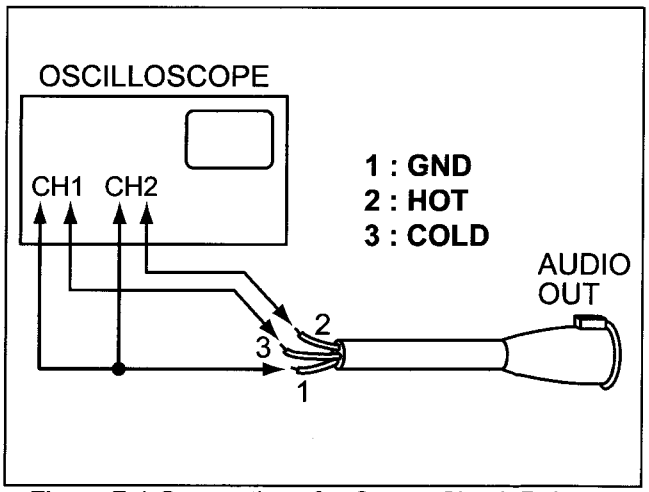


Figure 7-1 Connections for Output Circuit Balance Adjustment

<NOTE>

- Model **AJ-D940P** should be adjusted in **525 (NTSC)** mode and models **AJ-D940E and AJ-D940EG** should be adjusted in **625 (PAL)** mode.

1. Open the menu and set ***713: MONI OUT*** to **UNITY**.
2. Connect the **HOT** output of each AUDIO OUT and MONI OUT channel to **CH1** of the oscilloscope, and the **COLD** output to CH2, as shown in *Figure 7-1*.
3. Place the oscilloscope in **ADD** mode and adjust the VR corresponding to each channel until the waveform is minimized.

7.3 OUTPUT LEVEL ADJUSTMENT

C.B.A.	A ADDA (F8)
TP	AUDIO OUT : CH1/2/3/4 MONI OUT : L-CH, R-CH
ADJ.	VR401 (CH1)(H-2), VR476 (CH2)(G-2) VR551 (CH3)(B-2), VR626 (CH4)(A-2) VR702 (L-CH)(F-1), VR701 (R-CH)(D-1)
TAPE	525 (NTSC): VFM3380KM 625 (PAL): VFM3480KM 1kHz Ref. Level (Color Bar)
INPUT	-
MODE	PLAY
M. EQ	VTVM (DVM)
SPEC.	AJ-D940P/E : **0dBu±0.2dB** AJ-D940EG : **-3dBu±0.2dB**

<NOTE>

- Model **AJ-D940P** should be adjusted in **525 (NTSC)** mode and models **AJ-D940E and AJ-D940EG** should be adjusted in **625 (PAL)** mode.

1. Connect the AUDIO OUT and MONI OUT channel outputs to VTVM (DVM), as shown in *Figure 7-2.*

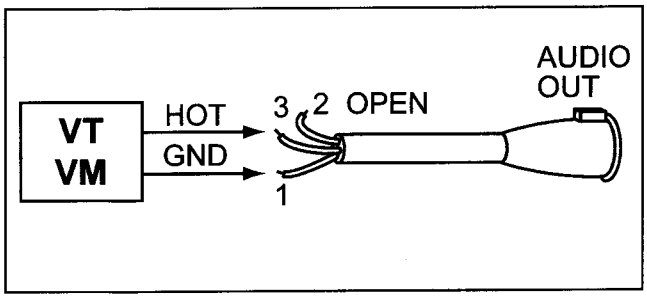


Figure 7-2 Connections for Output Level Adjustment

2. Use the table above to adjust the VR corresponding to each channel.

8. CUE (H1)

Perform this adjustment after making the following initializations.

1. Set **SW2 (C-2)** on the CUE P board to **NORMAL**.
2. Set pin 1 of the DIP switch behind the front panel to **ON** and open the Service Menu.
3. Open the ***F00 : AUDIO ADJUST*** menu and enter the following settings:

Item	AJ-D940P	AJ-D940E	AJ-D940EG
F01: REF_LEVEL1	FS-20	FS-18	FS-18
F02: REF_LEVEL2	0dB	0dB	-3dB
F03: REF_LEV_INI	0dB	0dB	0dB

In specifications for Germany (AJ-D940EG), F02: REF_LEVEL2 can be set to-3dB only when F01: REF_LEVEL1 is set to FS-18 beforehand.

4. Close the menu and set pin 1 of DIP switch to **OFF**.
5. Press the **MENU** button to open ***710: CUE OUT LV*** in the ***SET-UP MENU*** and enter the following settings.

Menu Name	AJ-D940P/E	AJ-D940EG
710 CUE OUT LV	0dB	-3dB

C.B.A.	CUE (H1)
TP	CUE OUT
ADJ.	VR4002 (C-1)
TAPE	525 (NTSC): VFM3380KM 625 (PAL): VFM3480KM 1kHz Cue Ref. Level (Color Bar)
INPUT	-
MODE	PLAY
M. EQ	VTVM (DVM)
SPEC.	AJ-D940P/E : **0dBu±0.5dB** AJ-D940EG : **-3dBu±0.5dB**

<NOTE>

- Model **AJ-D940P** should be adjusted in **525 (NTSC)** mode and models **AJ-D940E and AJ-D940EG** should be adjusted in **625 (PAL)** mode.

1. Connect CUE OUT to VTVM (DVM) as shown in *Figure 8-1*.

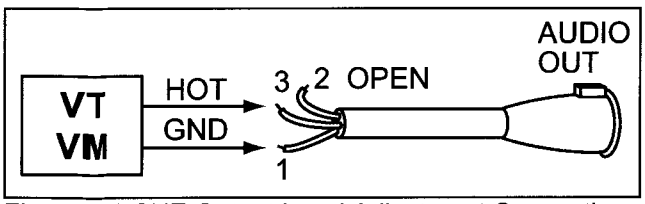


Figure 8-1 CUE Output Level Adjustment Connections

2. Adjust VR2 until the specification is attained.

C.B.A.	CUE (H1)
TP	CUE OUT
ADJ.	VR4003 (B-1), VR4006 (C-2)
TAPE	Blank tape
INPUT	-
MODE	STOP
M. EQ	Audio analyzer
SPEC.	Rated output-40dB or less

1. The audio analyzer is set as follows:

   MEASURE: BANDPASS
   BP/BR FREQ: 600Hz
   FILTER: OFF

2. Place in STOP mode. (Must be in 50M mode with the cylinder rotating.)
3. Perform the noise level measurements and adjust **VR4006** and **VR4003** alternately to minimize the noise level.

SECTION 9

BLOCK DIAGRAMS

CONTENTS

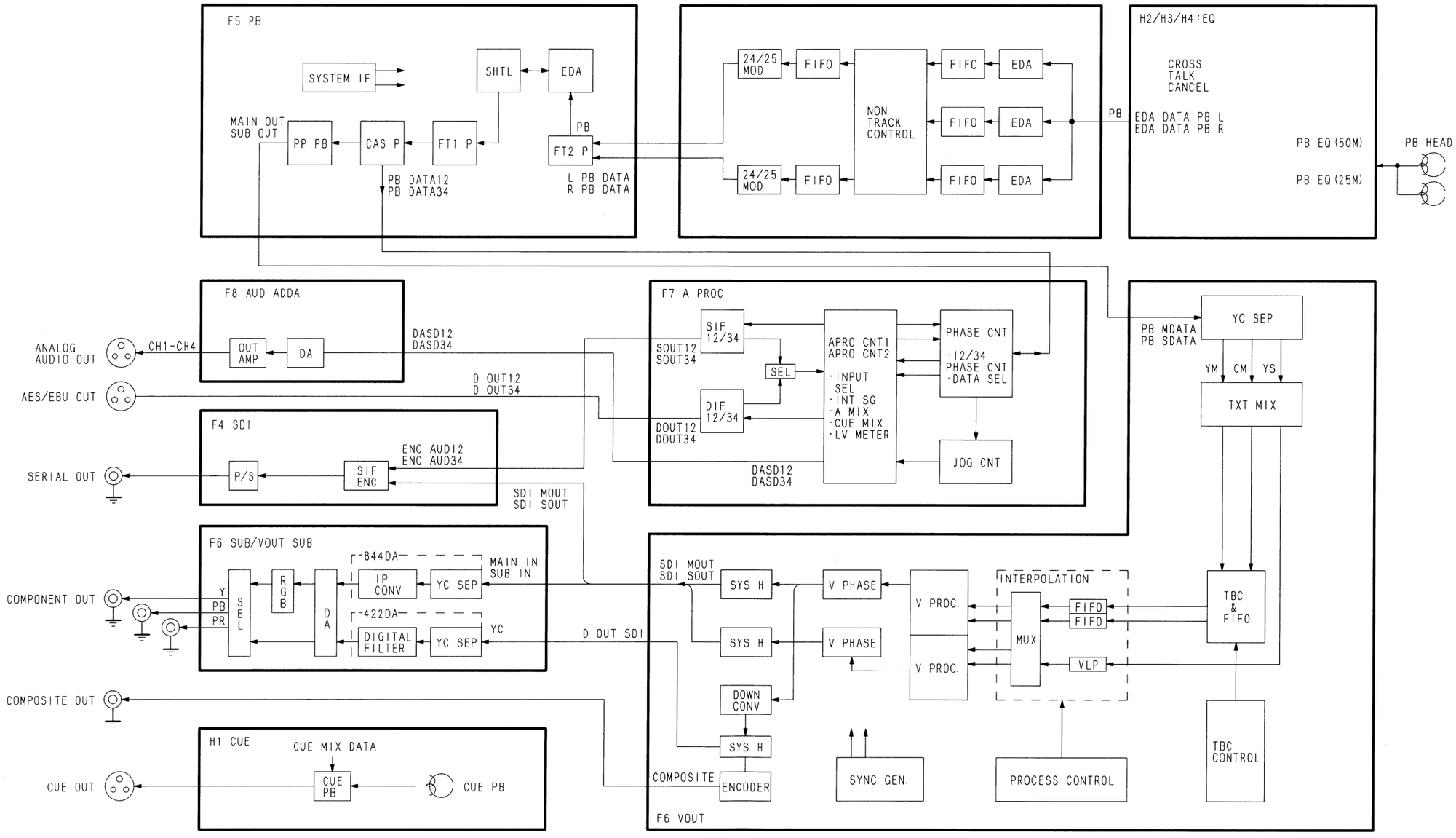
AV OVERALL BLOCK DIAGRAM BLK-1
F1 SERVO BLOCK DIAGRAM BLK-2
F2 SYSCON BLOCK DIAGRAM BLK-3
F3 NON_TRK BLOCK DIAGRAM BLK-4
F4 SDI BLOCK DIAGRAM BLK-5
F5 PB (1/2) BLOCK DIAGRAM BLK-6
F5 PB (2/2) BLOCK DIAGRAM BLK-7
F6 V OUT (1/2) BLOCK DIAGRAM BLK-8
F6 V OUT (2/2) BLOCK DIAGRAM BLK-9
F6 V OUT SUB BLOCK DIAGRAM BLK-10
F7 A PROC (1/2) BLOCK DIAGRAM BLK-11
F7 A PROC (2/2) BLOCK DIAGRAM BLK-12
F8 AUDIO AD/DA BLOCK DIAGRAM BLK-13
H1 CUE BLOCK DIAGRAM BLK-14
H2/H3/H4: EQ BLOCK DIAGRAM BLK-15
HEAD_AMP BLOCK DIAGRAM BLK-16

6 BLOCK DIAGRAMS

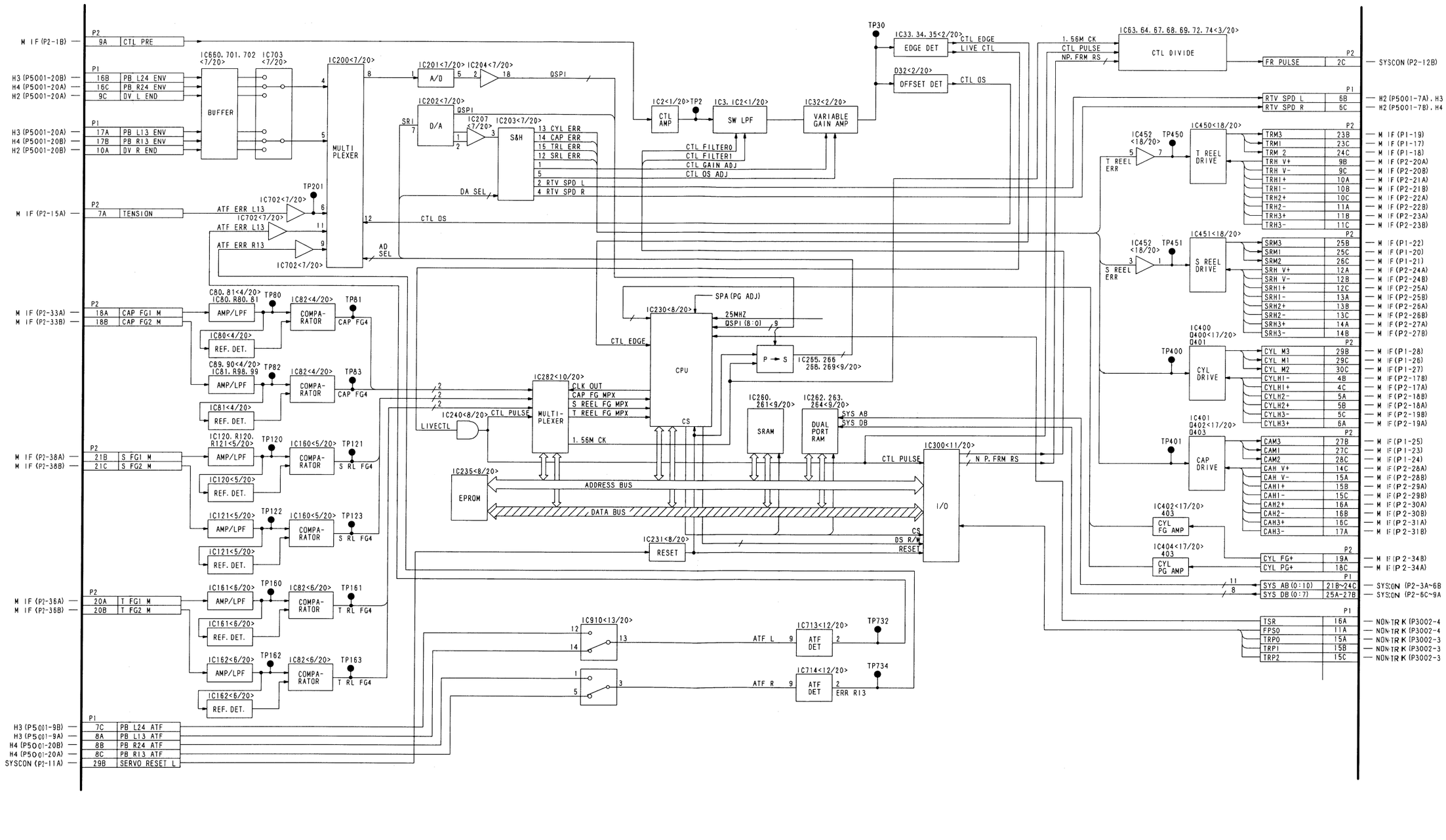
CONTENTS

AV OVERALL BLOCK DIAGRAM BLK-1
FI SERVO BLOCK DIAGRAM BLK-2
F2 SYSCON BLOCK DIAGRAM BLK-3
F3 NON_TRK BLOCK DIAGRAM BLK-4
F4 SCH BLOCK DIAGRAM BLK-5
F5 P/L (1/2) BLOCK DIAGRAM BLK-6
F6 P/L (2/2) BLOCK DIAGRAM BLK-7
F8 V OUT (1/2) BLOCK DIAGRAM BLK-8
F8 V OUT (2/2) BLOCK DIAGRAM BLK-9
F8 V OUT SUB BLOCK DIAGRAM BLK-10
F7 A PROC (1/2) BLOCK DIAGRAM BLK-11
F7 A PROC (2/2) BLOCK DIAGRAM BLK-12
F8 AUDIO ADRA BLOCK DIAGRAM BLK-13
H1 TUE BLOCK DIAGRAM BLK-14
H2/3/H4 TEG BLOCK DIAGRAM BLK-15
HEAD_AMP BLOCK DIAGRAM BLK-16

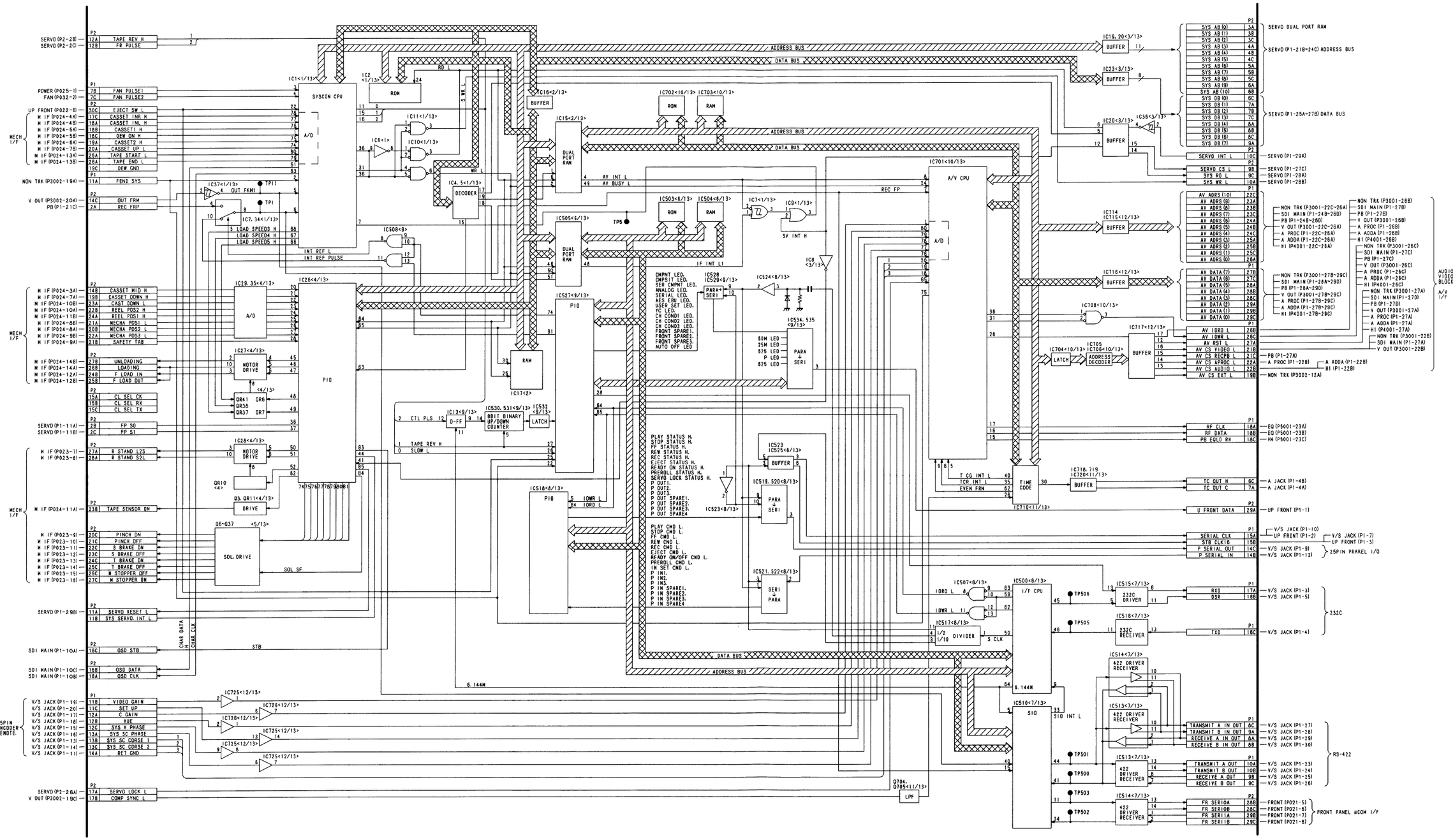
AV OVERALL BLOCK DIAGRAM



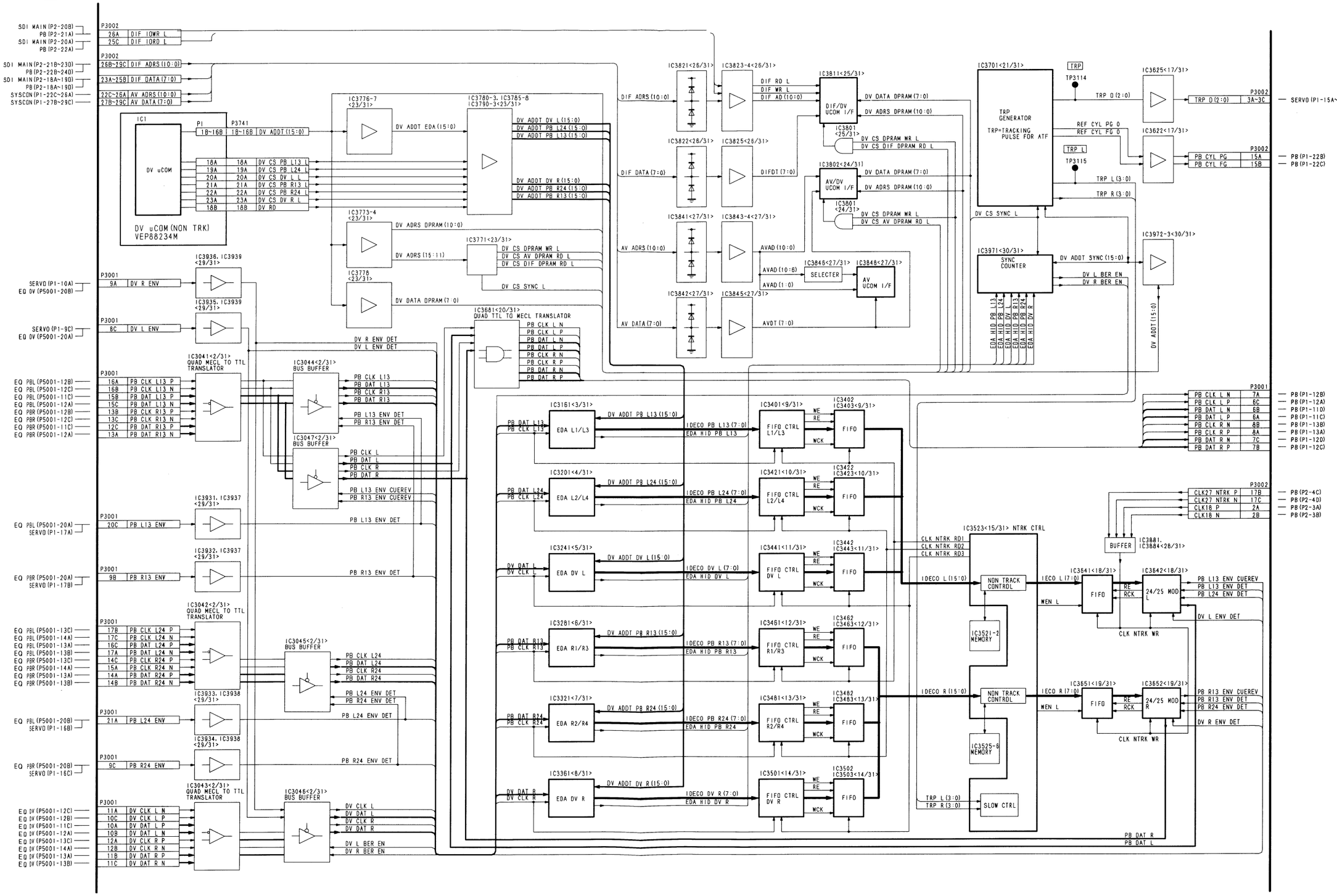
F1 SERVO BLOCK DIAGRAM



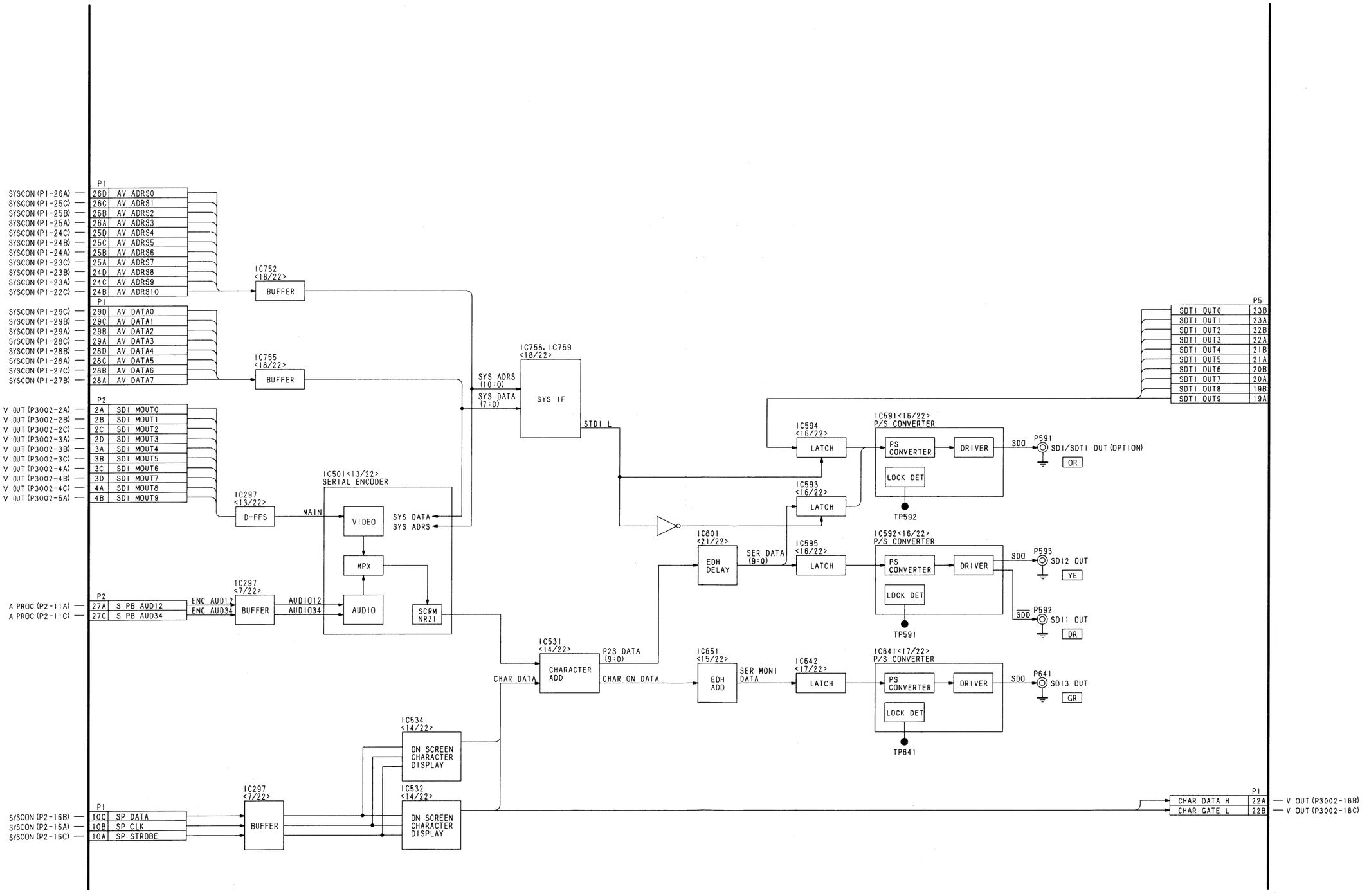
F2 SYSCON BLOCK DIAGRAM



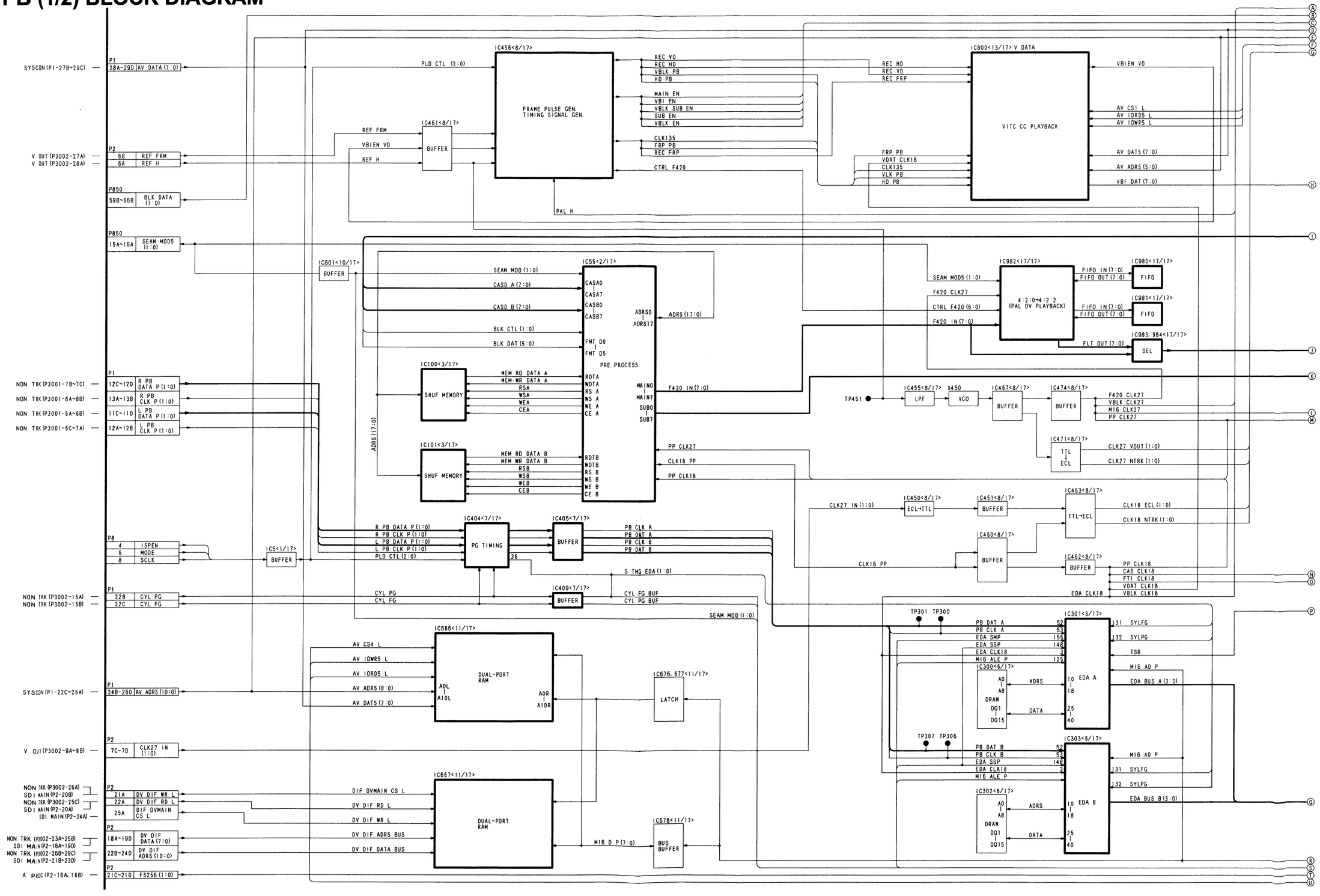
F3 NON_TRK BLOCK DIAGRAM



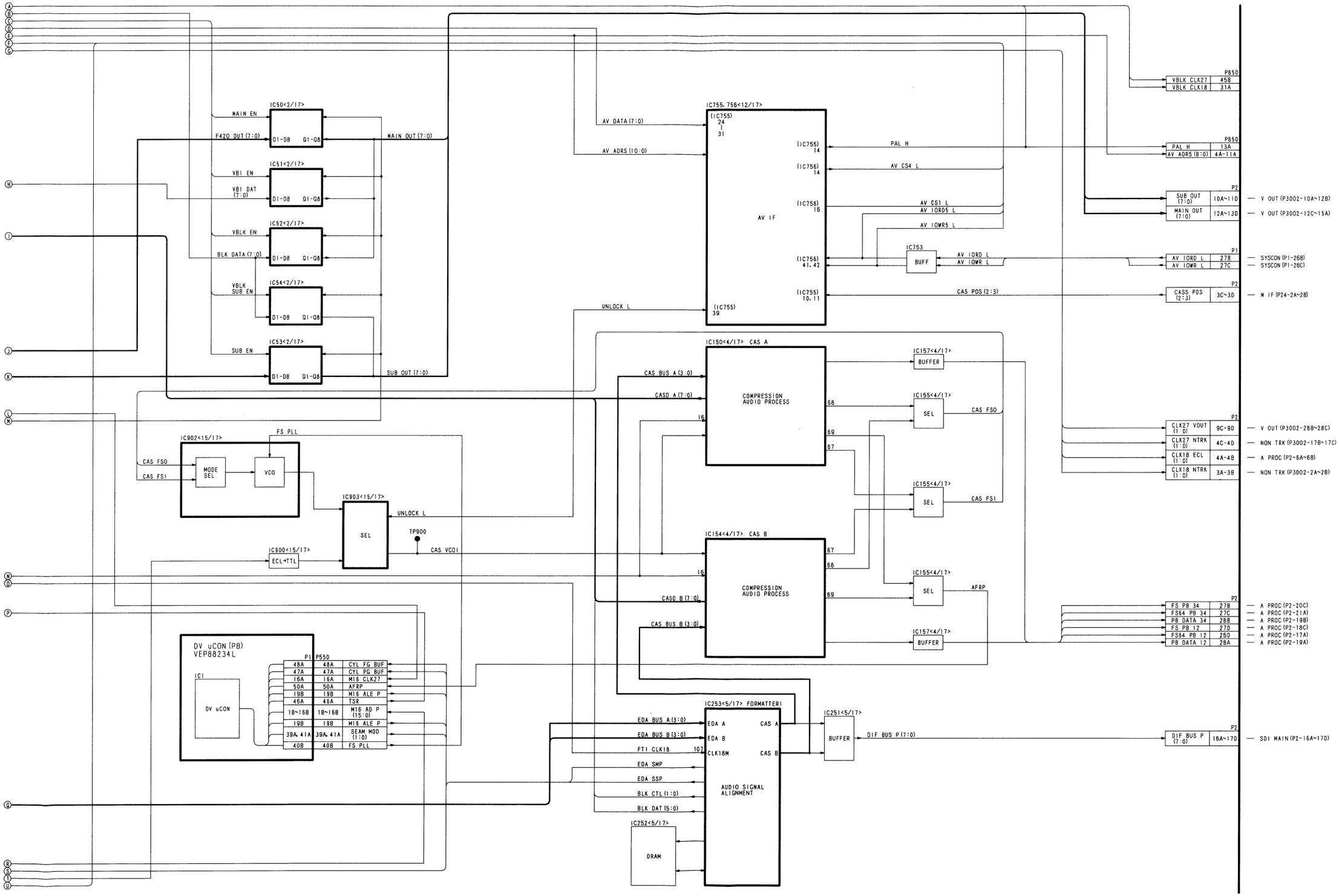
F4 SDI BLOCK DIAGRAM



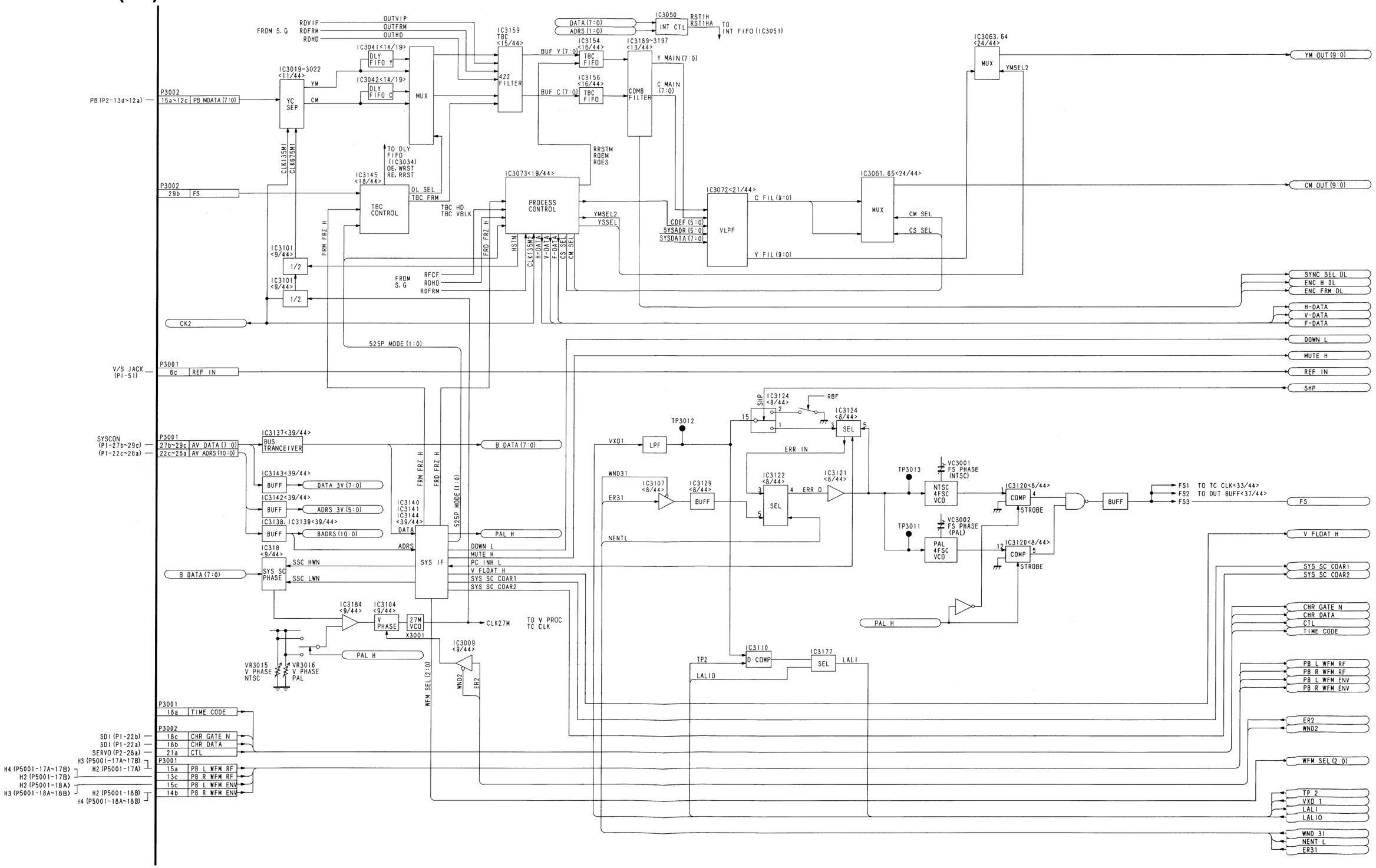
F5 PB (1/2) BLOCK DIAGRAM



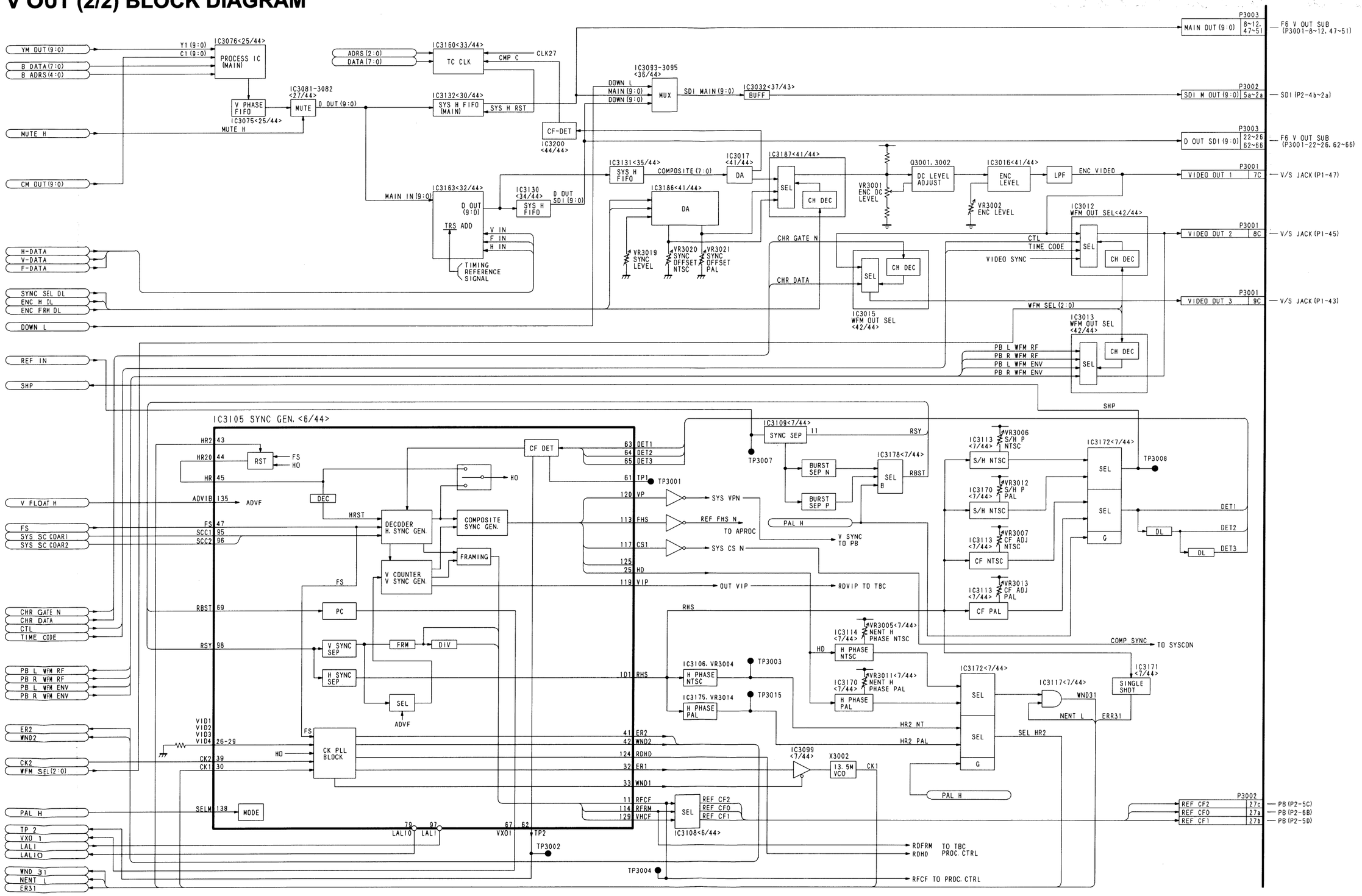
F5 PB (2/2) BLOCK DIAGRAM



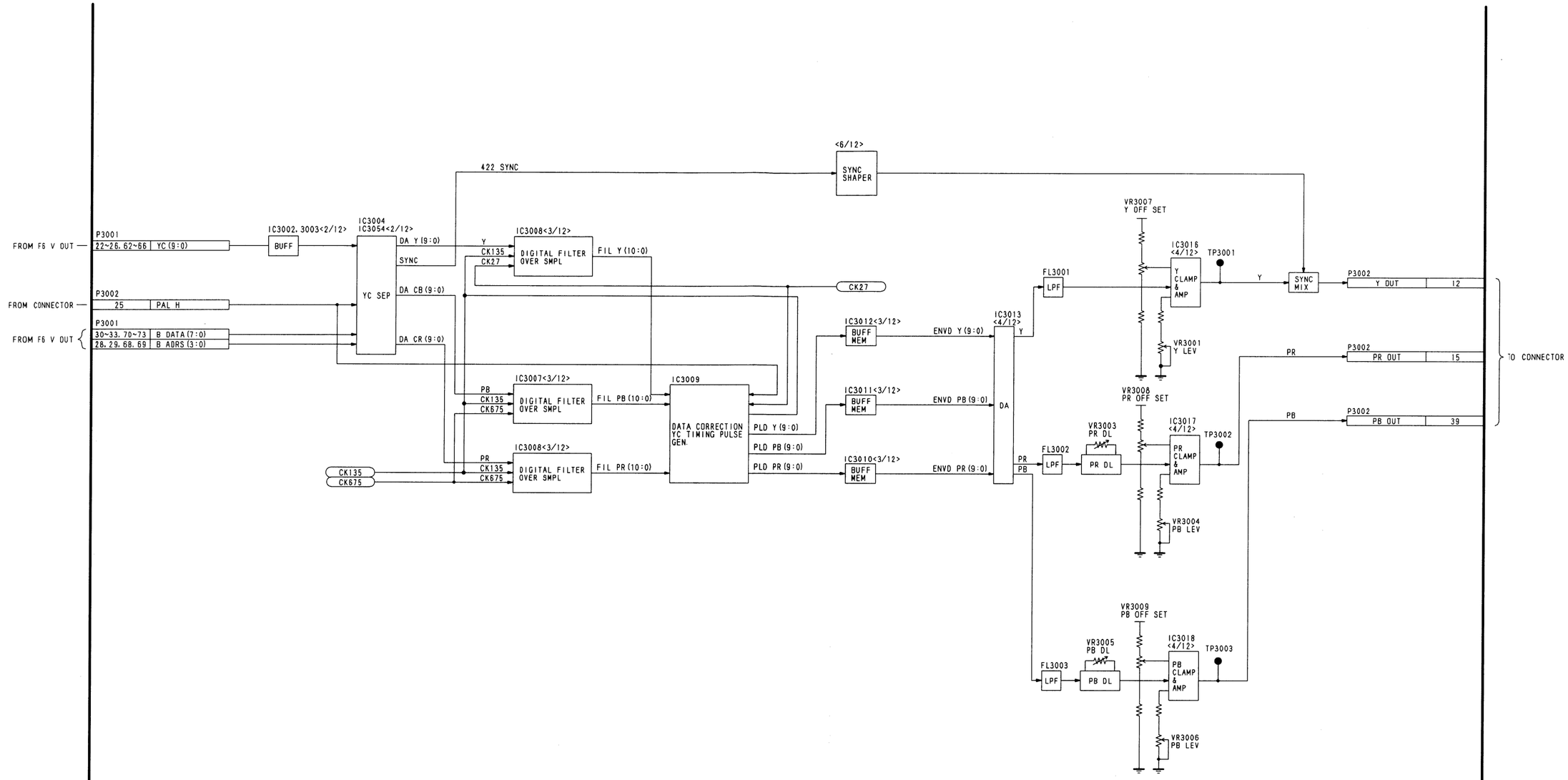
F6 V OUT (1/2) BLOCK DIAGRAM



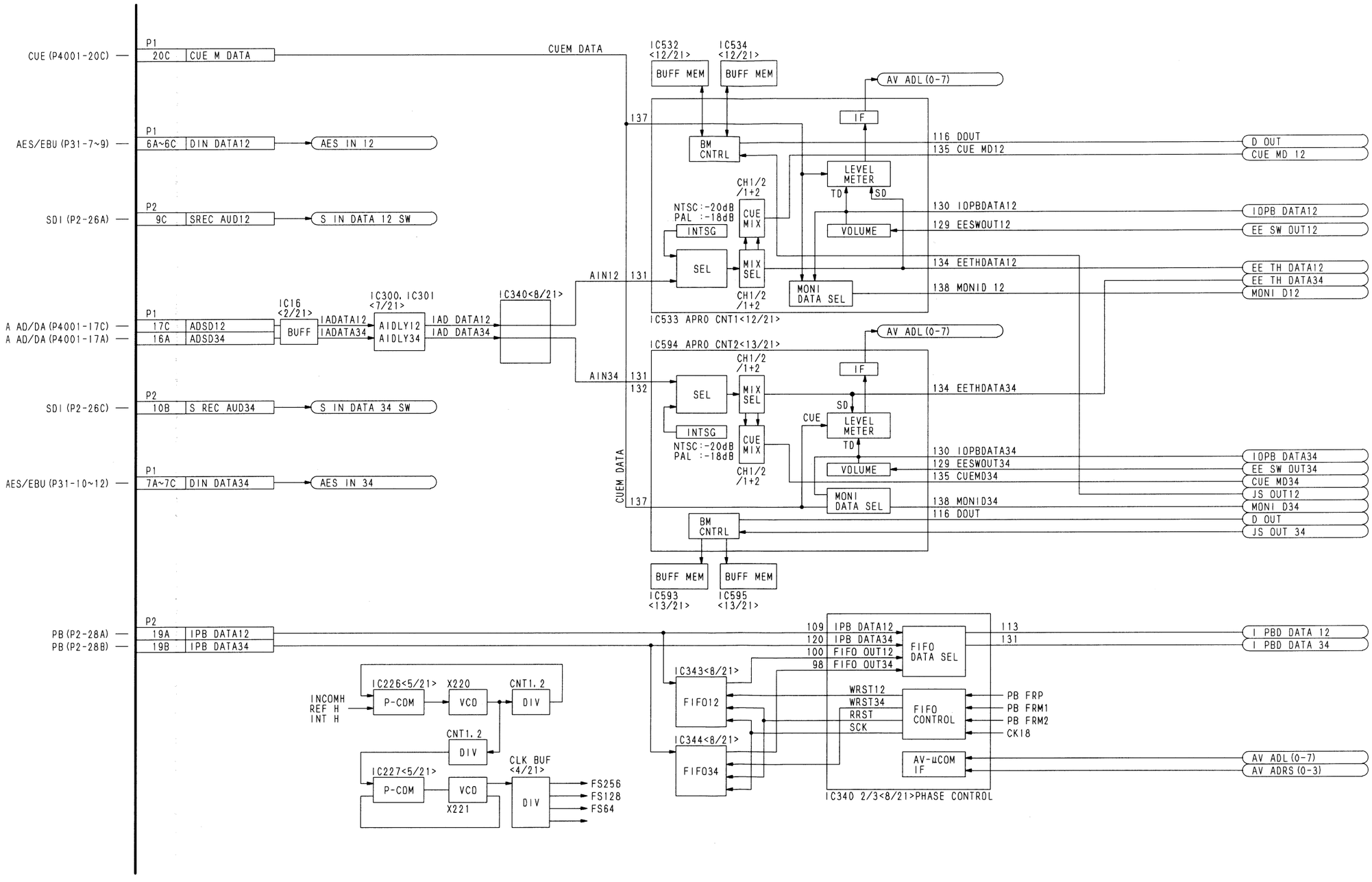
F6 V OUT (2/2) BLOCK DIAGRAM



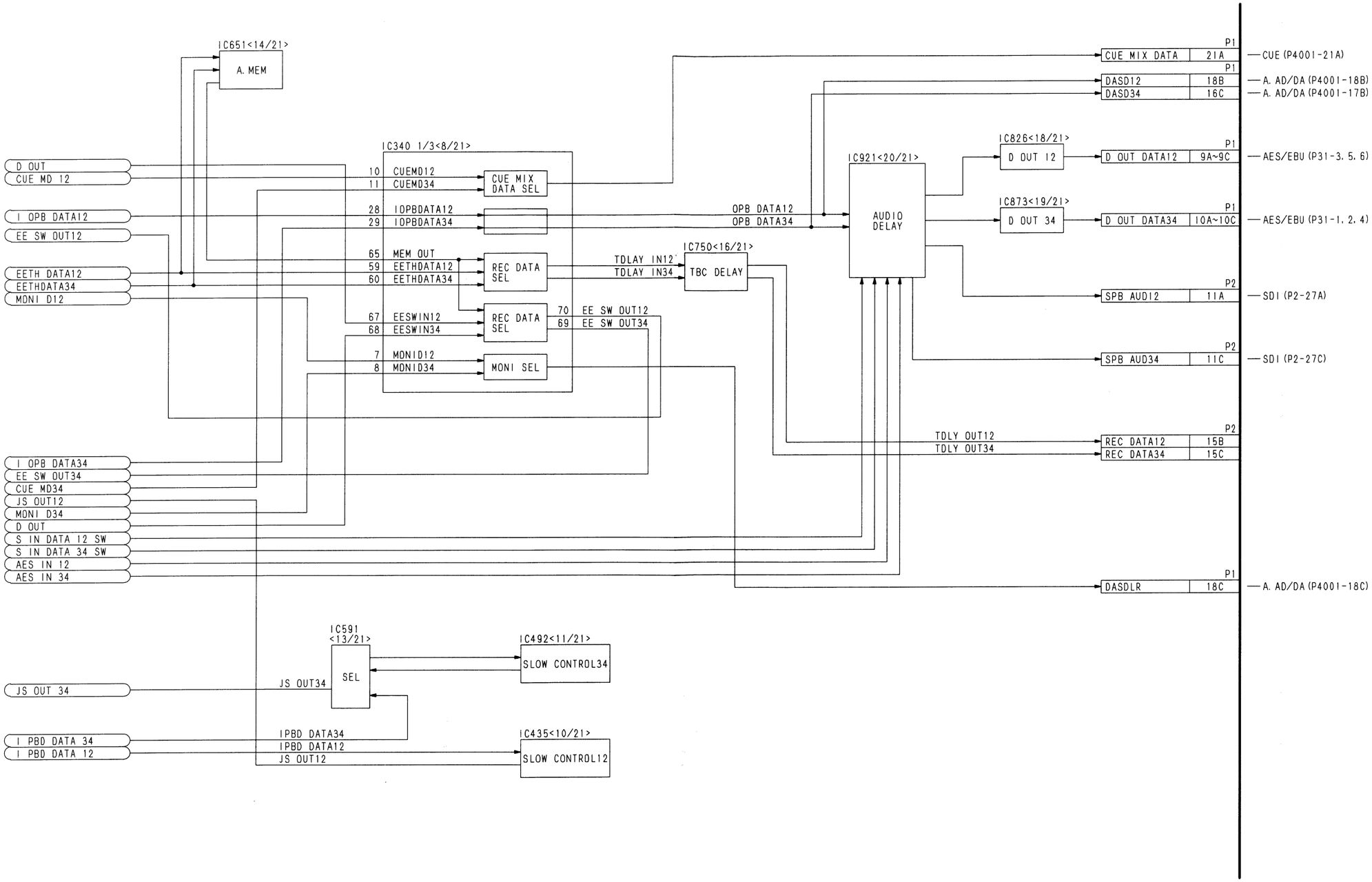
F6 V OUT SUB BLOCK DIAGRAM



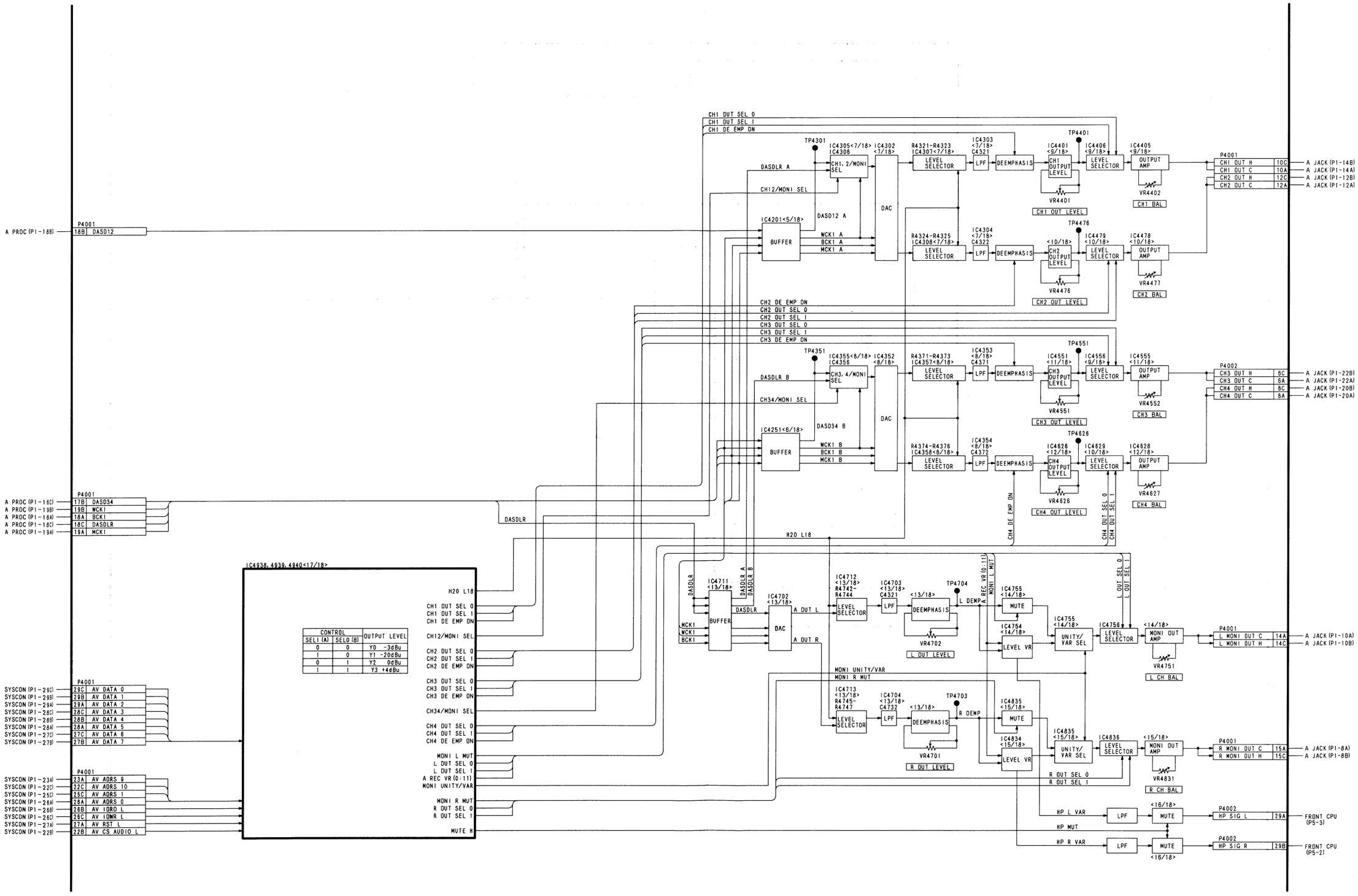
F7 A PROC (1/2) BLOCK DIAGRAM



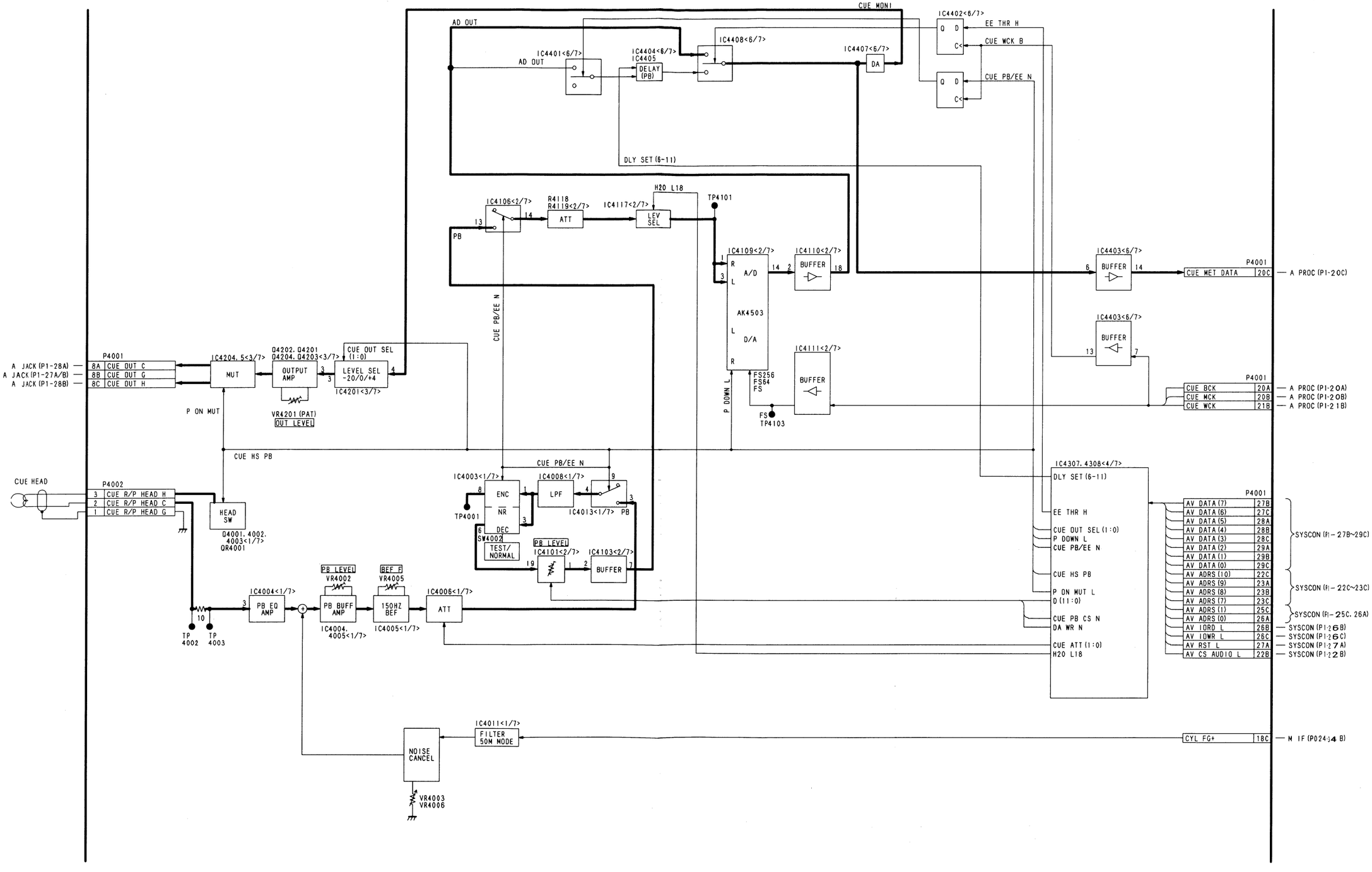
F7 PROC (2/2) BLOCK DIAGRAM



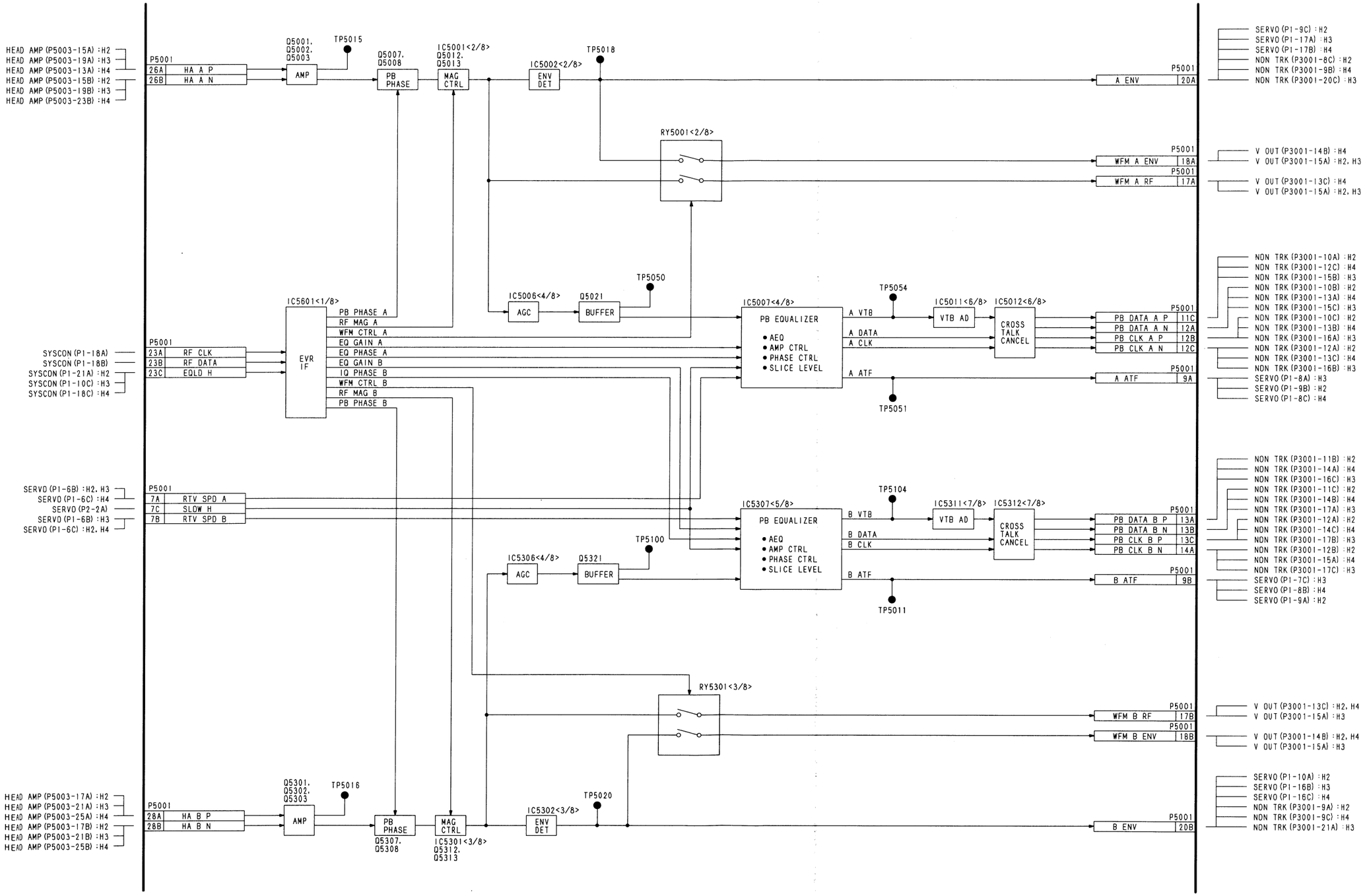
F8 AUDIO AD/DA BLOCK DIAGRAM



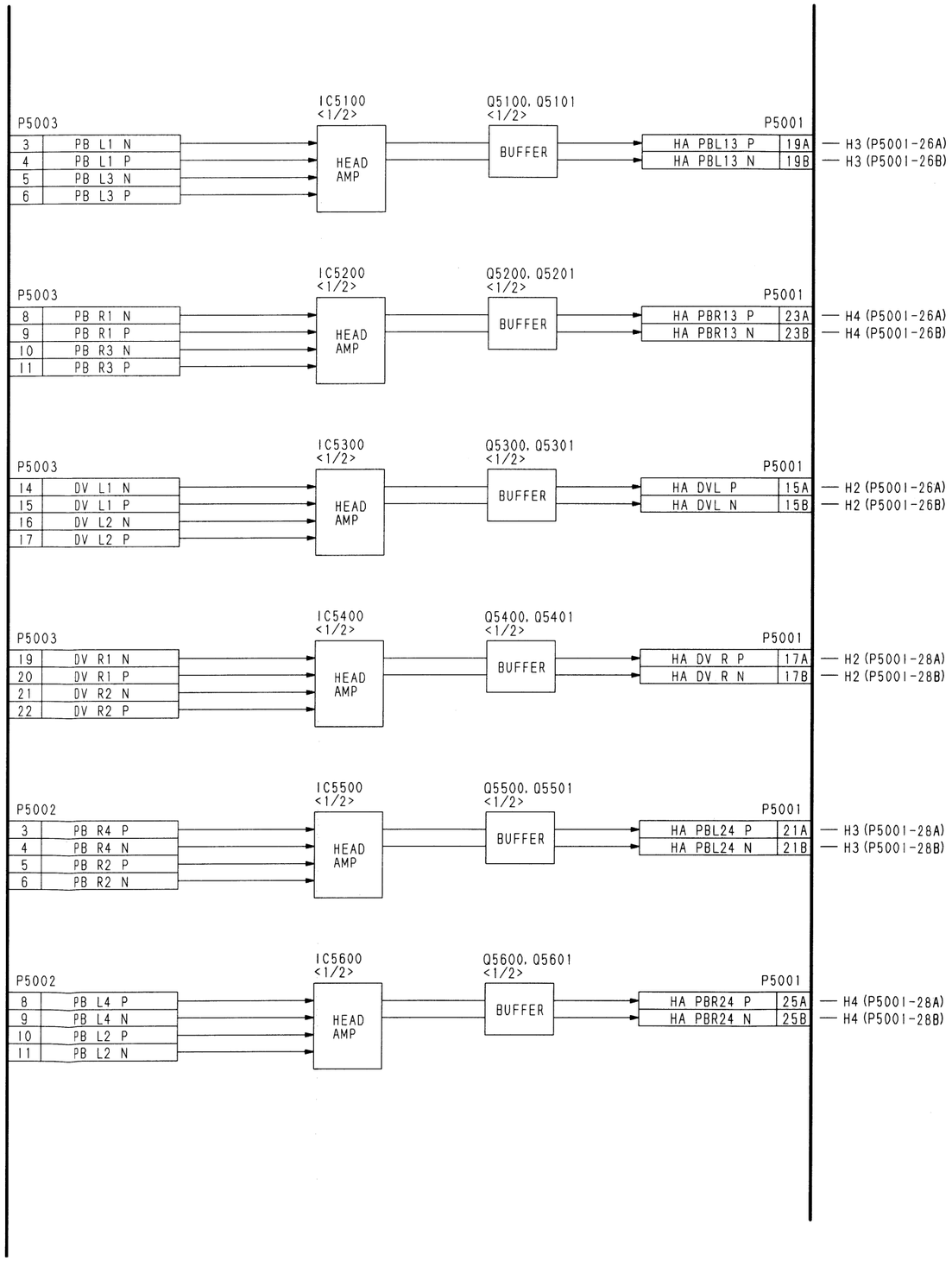
H1 CUE BLOCK DIAGRAM



H2/H3/H4: EQ BLOCK DIAGRAM



HEAD_AMP BLOCK DIAGRAM



Order No. VSD9911SI699

Technical Bulletin

Supplement to the Service Manual

Broadcast Product

Subject : Software Version Up Grades

Please use this supplement together with the Service Manual as follows :

Model No.	Bulletin No.	Order No.	Effective from
AJ-D940E	16	VSD9903M902A/B	L9TRA0001

Board : Servo (F1:VEP82221A)
System Control (F2:VEP86284B)
Front CPU (VEP86285B)
DV_UCOM (F3 Sub:VEP88234M)

The following software has been up-dated to improve the functioning of the VTR.

Part Number

Ref. No.	Original Part No.	New Part No.	Part Name & Descriptions	Pcs	Remarks
IC235	VSI2976C	VSI2976D	F1 SERVO PROM Ver. 1.04	1	
IC2	VSI2972A	VSI2972B	F2 SYSCON PROM Ver. 1.02	1	
IC503	VSI2973B	VSI2973C	F2 I/F PROM Ver. 1.03	1	
IC702	VSI2974A	VSI2974B	F2 AV PROM Ver. 1.02	1	
IC2	VSI2975A	VSI2975B	FRONT PROM Ver. 1.02	1	
ID1	VSI2978A	VSI2978B	DV_SUB UCOM Ver. 1.02	1	

< TEST MENU >

*	SERVO	IC235	: F1-1.04	315D	*	SYSTEM	IC2	: F2-1.02	552C
*	I/F	IC503	: F2-1.03	60C8	*	AV	IC702	: F2-1.02	8D82
*	FRONT	IC2	: FR-1.02	570C		DV MAIN	ID1	: F5-1.01	347A
*	DV SUB	ID1	: F3-1.02	F6F6					

The marked (*) versions are the devices which have been changed from this software revision.

Note

1. To adapt the unit to AJ-YAC940P, be sure to introduce the modifications described in the Technical Bulletin No.VSD9911SI698 at the same time with the above software version up.
2. There is no problem even if the above software version up is introduced to the unit without AJ-YAC940P.

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- Major modifications -

No.	Item	Associated software				
		SYS	IF	AV	Front	Servo
1	Availability for SDTI	O	O	O	O	O
2	CUE UP function with BVE-800 is delayed.	O	O			
3	STILL editing starts at the second field.	O	O			
4	When the same user number is sent with the 9P USER FILE SELECT command more than one time, only the first time after POWER ON is effective.	O	O			
5	Addition of SETUP-MENU No.211: LOCAL 25P	O	O			
6	Availability for REMAIN TIME SENSE (60 • 2B) of 9P_command	O	O			
7	Addition of SETUP-MENU No.735 : MON AUTO SEL	O		O		
8	Addition of SERVICE-MENU No. E05 : 22L BLANK and SETUP-MENU No. 805 : 22 & 285 BLANK	O		O		
9	When a DV cassette is inserted and ejected before loading during SERVICE-MENU, adjustment values for DV are replaced by those for DVCPRO.	O				
10	When an S cassette (DV) is inserted, the unit may goes to DVCPRO mode.	O				
11	Standardization of 7.5% SETUP menu spec. (for NTSC)	O				
12	Malfunction of backup data control through RS232C	O				
13	Response of QRV command (software version information sense) returns as NTSC version even in the PAL model.		O			
14	When mode changes in the sequence: PLAY → **STOP** → REW → Detection of tape beginning → Short FF → STOP, CTL is displayed with the value at **STOP** after PLAY.		O			
15	When EJECT key is pressed in the mode except STOP, CTL is reset immediately.		O			
16	Excessive noise appears when the mode is changed from SHTL X1.0 to PLAY during DV playback mode.			O		
17	Audio noise when setting SETUP-MENU			O		
18	When the mode is changed from FF (REW) to EJECT right after cassette IN, MONITOR L/R is fixed at CUE and MONITOR SEL is disabled.			O		
19	Audio mute occurs after about three frames when the mode is changed from PLAY to STILL.			O		
20	When a cassette is ejected and inserted again, the picture stored before EJECT is output for a moment.			O		
21	Audio is muted for a moment when mode changes from CUE to PCM. Condition : SETUP-MENU MONI No.721 MONI CH SEL = AUTO1.			O		
22	System H phase shifts from normal position when power is turned ON. (Only NTSC)			O		
23	Mute at VAR IN point			O		
24	Monitor level remains low when power is turned on.			O		
25	Video phase of composite output shifts from normal position in PAL mode. ***Note1***			O		
26	Malfunction in setting PB LEVEL VR			O		
27	When STOP key is pressed during playback, stopping lags.					O
28	Edit precision is no good when CTL editing is performed successively in 50M mode.					O
29	Availability for Auto Adjustment Command through RS-232C	O	O			O
30	Availability for DVCAM playback					O

Note1 Hardware modification for F6: V OUT P.C. Board must be required. Refer to the Technical Bulletin No. VSD9911SI700.

-- Detailed description of modifications --

1. Availability for SDTI option

- The following menus can be displayed when an AJ-YAC940P is installed in the AJ-D940E.

SETUP Menu < VIDEO >

Item		Setting		Description
No.	Superimposed Display	No.	Superimposed Display	
652	SER OUT1 SEL	0000 0001 0002	SDI SDTI AUTO	For selecting the signals which are to be output to serial output 1. 0 : SDI signals are output. 1 : SDTI signals are output. 2 : SDTI signals are output during DVCPRO playback; SDI signals are output during DV playback.

Service Menu < VIDEO ADJUST >

Item		Setting		Description
No.	Superimposed Display	No.	Superimposed Display	
E04	SDTI FORMAT	00 1	NORMAL THRU	For selecting SDTI system data whether rewrite or not. 0 : Rewrite to conform the format. 1 : The data of the tape is output.

2. CUE UP function with BVE-800 is delayed.

- The unit goes through the CUE UP point and returns there. So CUE UP function with BVE-800 is delayed.

→ The software has been modified so that CUE UP can complete in a time equivalent to other models.

3. STILL editing starts at the second field.

- STILL editing by BVE-2000 starts from the second field.

→ The software has been modified to start it from the first field.

4. When the same user number is sent with the 9P USER FILE SELECT command more than one time, only the first time after POWER ON is effective.

→ Correcting software has improved this problem.

5. Addition of SETUP-MENU No.211: LOCAL 25P

- The SETUP Menu No.211 : LOCAL 25P has been added so that the parallel remote (25P) can be available even when REMOTE/LOCAL switch is at LOCAL.

SETUP Menu < INTERFACE >

Item		Setting		Description
No.	Superimposed Display	No.	Superimposed Display	
211	LOCAL 25P	0000 0001	OFF ON	For selecting parallel remote (25P) whether effective or not when REMOTE/LOCAL switch is at LOCAL. 0 : Not effective 1 : Effective

Operation of the unit depends on the position of REMOTE/LOCAL switch and the settings of setup menus.

REMOTE/LOCAL switch	Setup Menu 201: 9P SEL	Setup Menu 203: 25P SEL	Setup Menu 211: LOCAL 25P	Operation		
				25P	9P	FRONT
LOCAL	OFF/ON	OFF/ON	OFF	NG	NG	OK
			ON	OK		
REMOTE	OFF	OFF	OFF/ON	NG	NG	Depends on the setup menu 001: LOCALENA
		ON		OK		
	ON	OFF		NG	OK	
		ON		OK		

6. Availability for REMAIN TIME SENSE (60 • 2B) of 9P command

- The software has been modified to adapt the unit to REMAIN TIME SENSE (command that requires tape remaining time data) of 9P command

7. Addition of SETUP-MENU No.735: MON AUTO SEL

- When AUTO1 or AUTO2 is selected as the SETUP Menu item No.721 (MONI CH SEL), the unit automatically outputs the cue signals according to the mode. The SETUP Menu item No.735 : MON AUTO SEL has been added to select the monitor channel which is switched automatically to CUE or not.

SETUP Menu < AUDIO >

Item		Setting		Description
No.	Superimposed Display	No.	Superimposed Display	
735	MON AUTO SEL	0000 0001 0002	L/R L R	When the setting except MANU is selected as the setup menu item No.721 (MONI CH SEL), the unit automatically output the cue signals according to the mode. This menu item is for selecting which monitor channel is to be switched automatically to CUE. 0 : CUE is output to both L and R channels. 1 : CUE is output to only L channel. 2 : CUE is output to only R channel.

Each output at a speed that the cue signal is output automatically in search mode

731:CUE OUT SEL	721:MONI CH SEL	735:MON AUTO SEL	Monitor output		Main line output			
			Lch	Rch	CH1	CH2	CH3	CH4
OFF	MANU	L/R	Channel selected by MONITOR L SELECT switch	Channel selected by MONITOR R SELECT switch	CH1	CH2	CH3	CH4
		L						
		R						
	AUTO1 or AUTO2	L/R	CUE	CUE				
		L	CUE	Channel selected by MONITOR R SELECT switch				
		R	Channel selected by MONITOR L SELECT switch	CUE				
ON	MANU	L/R	Channel selected by MONITOR L SELECT switch	Channel selected by MONITOR R SELECT switch	CH1	CH2	CH3	CH4
		L						
		R						
	AUTO1 or AUTO2	L/R	CUE	CUE	CUE	CUE	CUE	CUE
		L	CUE	Channel selected by MONITOR R SELECT switch	CUE	Channel selected by MONITOR R SELECT switch	CUE	Channel selected by MONITOR R SELECT switch
		R	Channel selected by MONITOR L SELECT switch	CUE	Channel selected by MONITOR L SELECT switch	CUE	Channel selected by MONITOR L SELECT switch	CUE

8. Addition of SERVICE-MENU No.E05 : 22L BLANK and SETUP-MENU No.805 : 22 & 285 BLANK

- The SETUP Menu item No.805 : 22 & 285 BLANK has been added to make it possible to blank the 22nd and 285th lines.

SETUP Menu < V BLANK >

Item		Setting		Description
No.	Superimposed Display	No.	Superimposed Display	
805	22 & 285 BLANK	0000 0001	OFF ON	This sets the blanking to ON or OFF for the 22nd and 285th lines of the video output signals. 0 : None of the lines are blanked. 1 : The lines are forcibly blanked.

Service Menu <VIDEO ADJUST>

Item		Setting		Description
No.	Superimposed Display	No.	Superimposed Display	
E05	22L BLANK	0 1	OFF ON	This selects whether the setup menu No.805 : 22 & 285 BLANK is effective or not. 0 : Setup menu No.805: 22 & 285 BLANK does not appear. 1 : Setup menu No.805: 22 & 285 BLANK appears.

9. When a DV cassette is inserted and ejected before loading during SERVICE-MENU, adjustment values for DV are replaced by those for DVCPRO.

- When a DV cassette is inserted during SERVICE MENU (during displaying the screen for adjusting EQ1, EQ2 or EQ3) and ejected before loading, adjustment values for DV are replaced by those for DVCPRO. So after that operation, DV playback is abnormal.

→ Correcting software has improved this problem.

10. When an S cassette (DV) is inserted, the unit may goes to DVCPRO mode.

- It may be due to the malfunction of the switch for detecting a thin-thickness tape.

→ The software has been modified to detect a thin-thickness tape only for L size cassette.

11. Standardization of 7.5% SETUP Menu specification (for NTSC)

- Default (initial) setting of the SETUP Menu No.622 – 01 : CMPST OUT has been changed. (~~THRU~~ → ADD)

SETUP Menu < VIDEO >

Item		Setting		Description
No.	Superimposed Display	No.	Superimposed Display	
622	SETUP 25			This selects the setup level for each input/output signal in the DVCPRO (25 Mbps) mode. When the STOP button is pressed, operation transfers to the sub-screen, and the setup level is set for each input/output. Press the STOP button again to return from the sub-screen. **<Note>** This setup menu is not displayed in the 625 mode.
Sub-screen				
01	CMPST OUT	0000 0001	THRU ADD	This selects the composite output signal. 0 : The signals are output with no setup added. 1 : The signals are output with the 7.5% setup added. **<Note>** Bear in mind the setting for sub-screen item No.03 (CMPNT OUT) of setup menu item No.622 (SETUP 25).
03	CMPNT OUT	0000 0001	THRU CUT	This selects the way in which the composite, component and serial (digital) signals are to be output. 0 : The signals are output in their original form. 1 : The signals are output with the 7.5% setup removed.

12. Malfunction of backup data control through RS232C

- The following problems may occur in controlling backup data through RS232C.

① If the data of SETUP menu is preset, the picture remains gray at the next Power ON. It is recovered by resetting the System menu.
② Whenever the backup control is done, count of HOURS METER H30 : POWER ON increases by one.
③ The data of SETUP menu No.622 : SETUP25 and No.623 : SETUP50 can not be requested or preset.

→ Correcting software has improved these problems.

13. Response of QRV command (software version information sense) returns as NTSC version even in the PAL model.

Example before modification :
[STX] VERN1.02 [ETX]
↑
N (NTSC)

Example after modification
[STX] VER_1.02 [ETX]
↑
Blank

14. When mode changes in the sequence : PLAY → **STOP** → REW → Detection of tape beginning → Short FF → STOP, CTL is displayed with the value at **STOP** after PLAY.

- It is due to error in compensation process of CTL output.

→ Correcting software has improved this problem.

15. When EJECT key is pressed in the mode except STOP, CTL is reset immediately.

- When EJECT key is pressed in STOP mode, CTL is reset after a cassette is ejected completely. But when EJECT key is pressed in the mode except STOP, CTL is reset immediately.

→ The software has been modified to reset CTL after a cassette is ejected completely even from the mode except STOP.

16. Excessive noise appears when mode changes from SHTL X1.0 to PLAY during DV playback mode.

→ Correcting software has improved this problem.

17. Audio noise when setting SETUP-MENU

- Audio noise may appear when switching the SETUP Menu No.00 : WFM SEL or setting SETUP Menus.

→ Correcting software has improved this problem.

18. When the mode is changed from FF (REW) to EJECT right after cassette IN, MONITOR L/R is fixed at CUE and MONITOR SEL is disabled.

- When the SETUP Menu No.721 : MONI CH SEL is set to AUTO1 or AUTO 2, the above symptom occurs.

→ Correcting software has improved this problem.

19. Audio mute occurs after about three frames when the mode is changed from PLAY to STILL.

- When the mode changes from PLAY to STILL, audio is muted before video goes to a STILL picture. Time difference is about three frame.

→ Correcting software has improved this problem.

20. When a cassette is ejected and inserted again, the picture stored before EJECT is output for a moment.

- When this symptom occurs, it may be detected incorrectly that another tape is inserted.

→ The software has been modified not to output the picture stored before EJECT mode.

21. Audio is muted for a moment when the mode changes from CUE to PCM. Condition : SETUP-MENU MONI No.721 MONI CH SEL = AUTO1

- Monitor selection changes from CUE to PCM before PCM mute during releasing the high-speed search. So audio is muted for a moment.

→ The software has been modified to output CUE while PCM is muted.

22. System H shifts from normal position when power is turned ON. (Only NTSC)

- This symptom rarely occurs.

→ Correcting software has improved this problem.

23. Mute at VAR IN point

- Mute release time is too long. So the unit remains being muted for a moment at VAR IN point.

→ Correcting software has improved this problem.

24. Monitor level remains low when power is turned ON.

- This symptom rarely occurs.

→ Correcting software has improved this problem.

25. Video phase of composite output shifts from normal position in PAL mode.

- Video phase of composite output shifts from normal position by 74nsec in PAL mode.

→ The software has been modified to put video phase of composite output in normal position.

26. Malfunction in setting PB LEVEL VR

- Setting of PB LEVEL VR is changed in STOP mode. The moment the unit moves to PLAY mode, setting of PB LEVEL VR returns to that before change.

→ Correcting software has improved this problem.

27. When STOP key is pressed during playback, stopping lags.

- It is due to unnecessary process during quick stop motion.

→ Correcting software has improved this problem.

28. Edit precision is no good when CTL editing is performed successively in 50M mode.

- When CTL editing is performed successively in 50M mode, CTL value may shift a little from normal one after completion of editing.

→ Correcting software has improved this problem.

29. Availability for Automatic Adjustment Command through RS-232C

- The software has been changed to adapt the unit to the Automatic Adjustment command through RS-232C.

30. Availability for DVCAM playback

- DVCAM playback has been introduced.

SETUP menu < BASIC >

Item		Setting		Description
No.	Superimposed Display	No.	Superimposed Display	
		When the SYSCON DIPS W501-8 is set to ON. (Setting for AJ-D940P and AJ-D940E/EG)		
014	FORMAT SEL	0000	DVCPRO	These settings are for selecting the format when an L cassette or S cassette is used. 0 : L cassette → DVCPRO (50Mbps, 25Mbps) mode S cassette → DV mode. 1 : L cassette/S cassette → DV mode 2 : L cassette/S cassette → DVCAM mode **<Note>** Bear in mind that, in addition to problems with playback, the trouble described below may occur when a tape, which does not match the selected format, is inserted. 1. The REMAIN display fails to appear properly. 2. The slow-down position near the tape start or end is not located accurately. 3. When a tape, which does not match the selected format, is inserted, no guarantee is given for the resulting performance, etc.
		0001	DV	
		0002	DVCAM	

Order No. VSD9912SI705

Technical Bulletin

Supplement to the Service Manual

Broadcast Product

Subject : Correction of Service Manual

Please use this supplement together with the Service Manual as follows			
Model No.	Bulletin No.	Order No.	Effective from
AJ-D940E	18	VSD9903M902A/B	-----

VOL.1

Please change the following the items in "SECTION 3" .

	No.	Item	Page
from	1-12	Tape Pass Adjustment Procedures	from MEC-12
to	1-44	Play Envelope Confirmation	to MEC-46

↓

from	1-12	Tape Pass Adjustment Procedures	from MEC-12
to	1-38	Play Envelope Confirmation	to MEC-34

※Please delete the items from "1-39". to "1-44".

VOL.2

Please add the below item to Section 8.

3-4.PG SHIFTER ADJUSTMENT ELC-3

Please refer to Service Manual CD-ROM (VSD99122DOX) about this modification items.

Panasonic

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SECTION 3

MECHANISM ADJUSTMENTS

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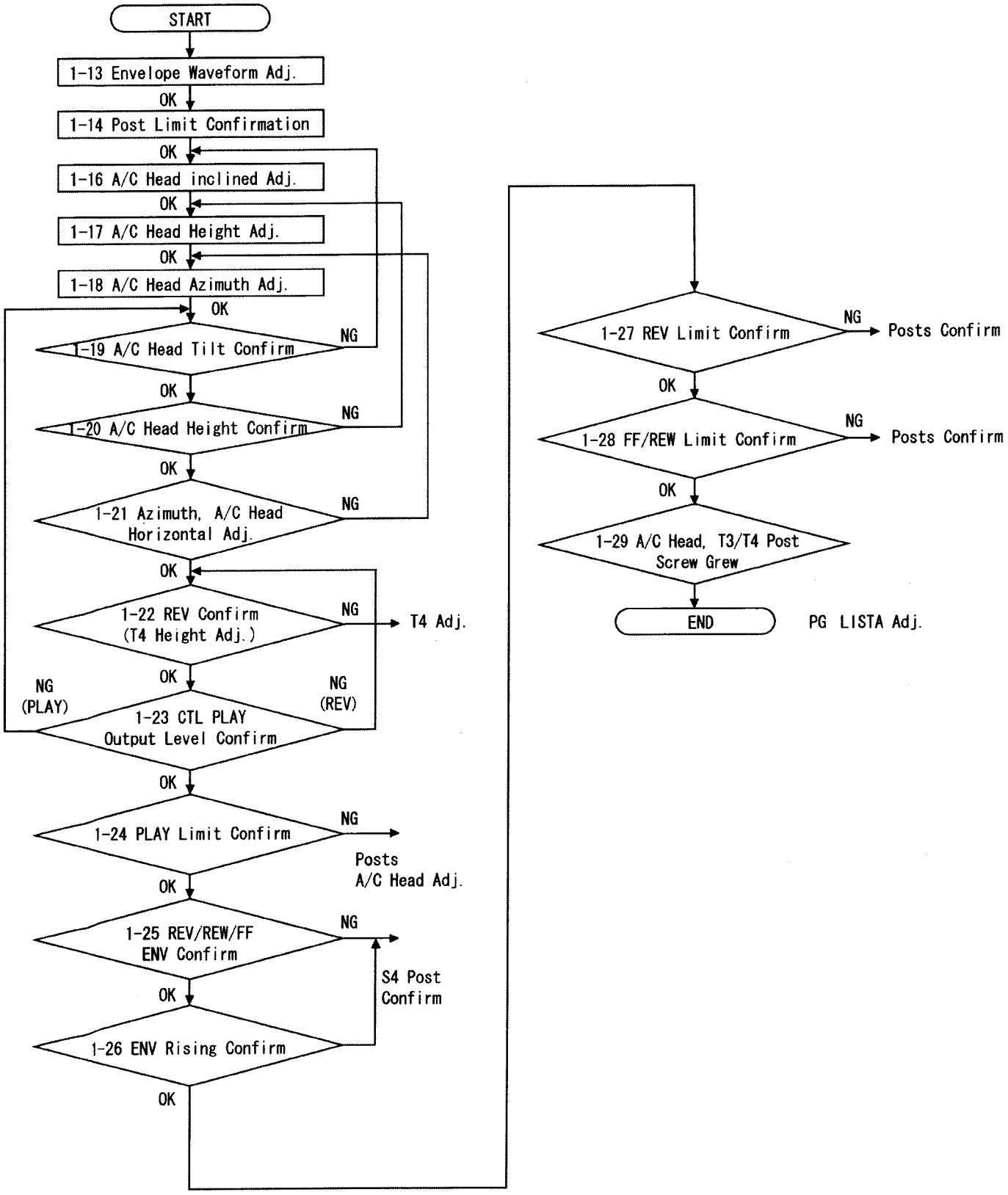
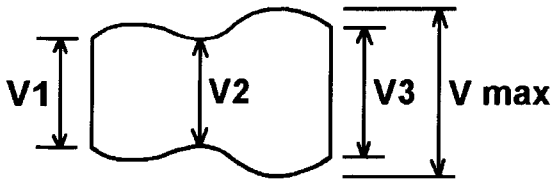
1-12. Tape Pass Adjustment Procedures



1-13. ENV waveform Adjustment

Specification	V1/Vmax、V3/Vmax≧0. 7, V2/Vmax≧0. 8 : VFM3580KM : VFM3680KM V1/Vmax、V2/Vmax、V3/Vmax≧0. 7 : VFM3580KL : VFM3680KL
Test Point	TP722(F1) for Trigger TP17(H3)(PB ENV L13)
Adjustment	S1、T1PostHeight
Mode	PLAY(ATF)
Tape	VFM3580KM(L):NTSC VFM3680KM(L):PAL
M. EQ.	Oscilloscope
Tool	VFK1149(Post Driver)

1. Playback the color bar portion of the alignment tape.
2. Adjust S1 and T1 post height so that the PB envelope output is in the specification.
3. When the S1 and T1 posts are adjusted, first raise the post height and make small the entrance and exit side of the envelope, then down the post until envelope becomes flat.
4. Adjust T1 post and makes exit side of the envelope flat then adjust S1 post.
5. After the adjustment, unload the tape then loading the tape. Confirm the waveform style.

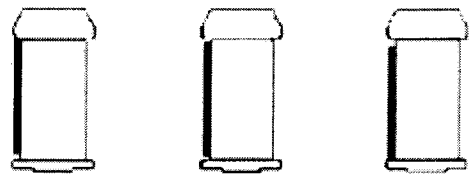


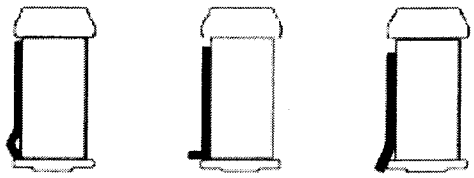
1-14. Post Limit Confirmation (Play)

Specification	No curl at the Tape edge All Post Limit
Mode	PLAY
Tape	Signal recorded Tape
Tool	VFK1149(Post Driver) VFK1151(Nut Driver)

1. Confirm the each Post Limit is as shown in figure, if it is not adjust the post height.
2. Confirm that there is no tape problem as D、E、F in the figure.

Post	Limit	Adjustment
S5	Free or Lower Limit	S5 Post Height
S4	Lower Limit	S4 Post Height
S1	Upper Limit	Linearity Coarse
T1	Upper Limit	Linearity Coarse
T3	Lower Limit	T3 Post Height
T4	Free or Lower Limit	T4 Post Height


A Upper B Free C Lower


D Curl E Bend F Drop

1-15. A/C Head ADJUSTMENT Method (summary)

Item	Screw	Adjustment	Torque
Tilt Adjustment	A	CW --- Decrease CUE Level CCW --- Increase CUE Level	(Adjustment)
Height Adjustment	B	CW --- If the level is increased at "k". CCW --- If the level is increased at "j".	(Adjustment)
Azimuth Adjustment	F	Adjust phase by the screw F.	(Adjustment)
A/C Head Horizontal Position Adj.	C D	Adjust A/C Head Horizontal Position by VFK0357 (Eccentric Driver) at long hole E, then tighten the screw C and D.	0.26 N · m (2.5 Kgf · cm)
Tilt	G	Adjust by tightening the screw except tilt and azimuth adjustment.	0.10 N · m (1.0 Kgf · cm)
Height Fix	H	After the Height Adjustment, tighten screw H to fix the A/C Head Height.	

Screw	Tool
A	VFK1178 (0.89 mm Nut Driver)
B	VFK1150 (5.5 mm Nut Driver)
F	VFK1148 (1.5 mm Nut Driver)
C, D, G	VFK1209 (Torque Driver) VFK0912 (1.5 mm Hex Driver Bit)
H	VFK1190 (1.5 mm L type Hex Wrench)

1 .Each Adjustment must be done keeping the screw G tighten.

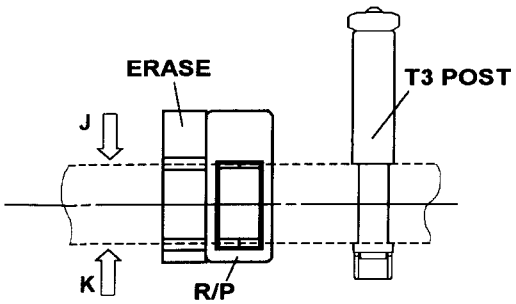
2 .When tilt is adjusted, confirm the screw A is tighten. (A/C Head must be touch with the fix plate.)

3 .When tilt is adjusted confirm that there is no tape damage at T3 Post.

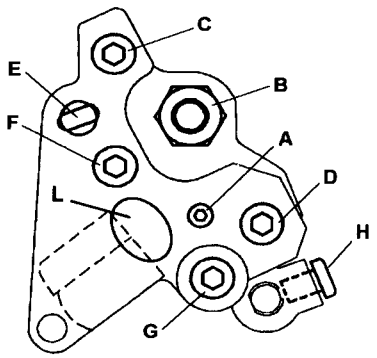
4 .When Height is Adjusted, loosen the screw H. After the adjustment tighten screw H.

5 .When the each Adjustment is done, each adjustment screw must be rotated CW.
And hit slightly the L part to remove the mechanical distortion.

6 .Adjust or confirm alternately each Adjustment and Envelope Output waveform Adjustment



A/C HEAD HEIGHT



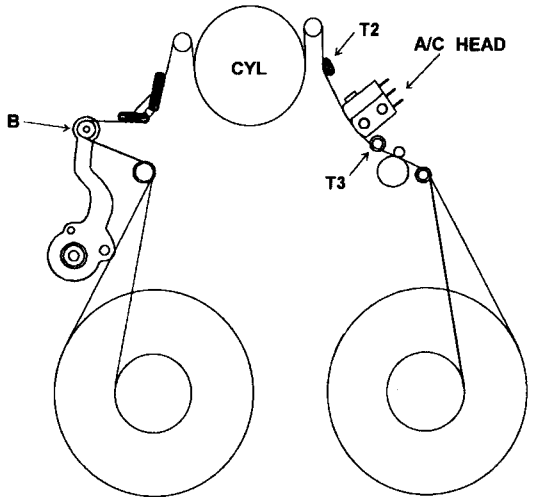
1-16. A/C Head Tilt Adjustment

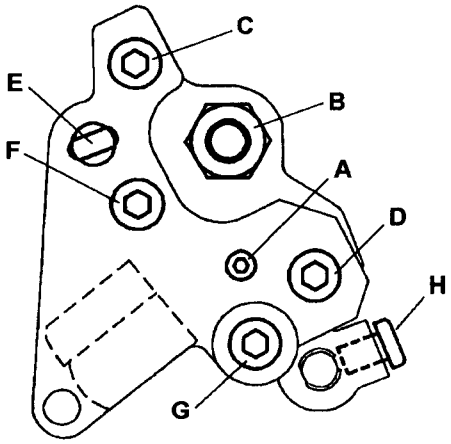
Specification	No curling and bending at tape edge. T3 Post Lower Limit
Adjustment	Screw A, G (A/C Head)
Mode	PLAY
Tape	Signal recorded Tape
Tool	VFK1148, VFK1178 (Hex Wrench)

1. Adjust A/C Head Tilt by screw A so that the Tape is at lower limit at T3 Post.
2. For this Adjustment, loosen screw G and make tape curling at T3 lower flange then gradually tighten screw G to make the tape flat. The screw G tightening torque is 0.10 N · m(1.0 Kgf · cm).

(Reference)

1. Screw A CW: Tape up
   Screw A CCW: Tape down
2. It is necessary to tighten the each adjustment screw when the adjustment is completed.
3. Confirm and adjust alternately this adjustment and A/C Head each adjustment (Azimuth and Height).





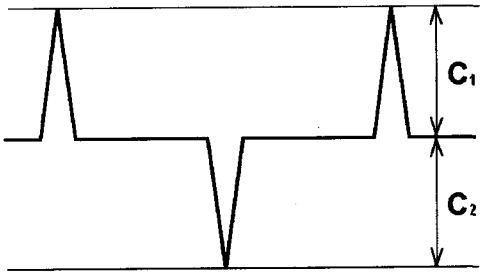
1-17. A/C Head Height Adjustment

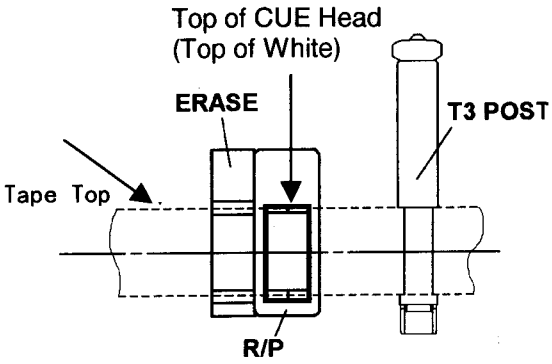
Board	SERVO
Specification	CTL Max (C1,C2=1.8V or more)
Test Point	TP30(SERVO:F1)
Adjustment	Screw B, H (A/C Head)
Mode	PLAY
Tape	VFM3580KM :NTSC VFM3680KM :PAL
M. EQ.	Oscilloscope
Tool	VFK1150(Nut Driver) VFK1190(Hex Wrench)

1. Connect a scope to TP30 on Servo (F1) board to observe CTL level.
2. Confirm that CTL level is decreased when A/C head is up and down at the point shown in the figure. If the CTL level is increased adjust nut B so that the CTL level is max.
3. Tighten screw H with 0.20 N · m (2.0 Kgf · cm) torque then confirm the CTL level again.

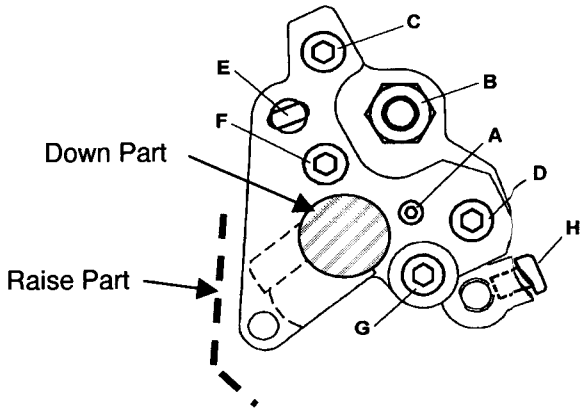
(Reference)

1. Confirm and adjust alternately this adjustment and A/C Head each adjustment (Azimuth and Height).





A/C HEAD HEIGHT

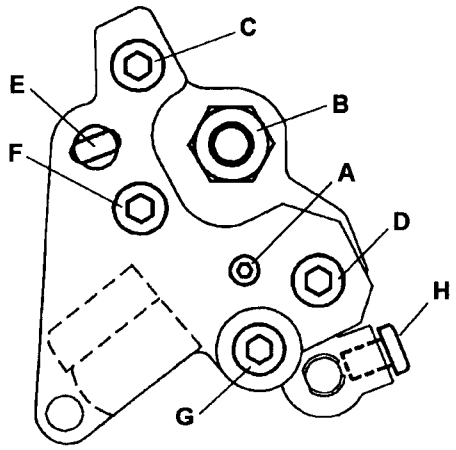


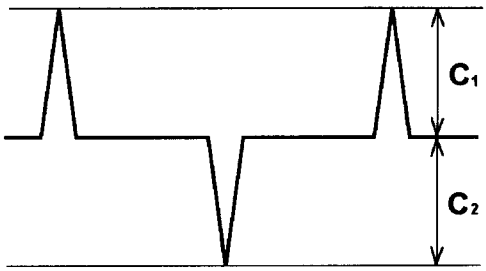
1-18. A/C Head Azimuth Adjustment

Board	SERVO
Specification	C1, C2 : Max
Test Point	TP30 (SERVO:F1)
Adjustment	Screw F (A/C Head)
Mode	PLAY
Tape	VFM3580KM: NTSC VFM3680KM: PAL
M. EQ.	Oscilloscope
Tool	VFK1148 (Hex Wrench) VFK1209 (Torque Driver)

1. Connect a scope to TP30 on Servo (F1) board. Then adjust A/C Head Azimuth by the screw F so that the CTL level is max.
2. For this Adjustment, loosen screw G and adjust screw F then tighten screw G with 0.10 N · m (1.0Kgf · cm) torque.

(Reference)
Confirm and adjust alternately this adjustment and A/C Head each adjustment (Azimuth and Height).

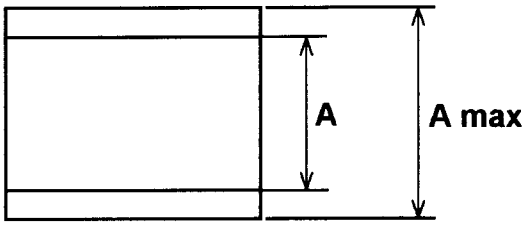


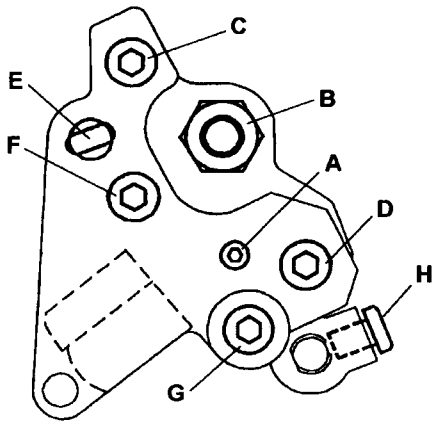


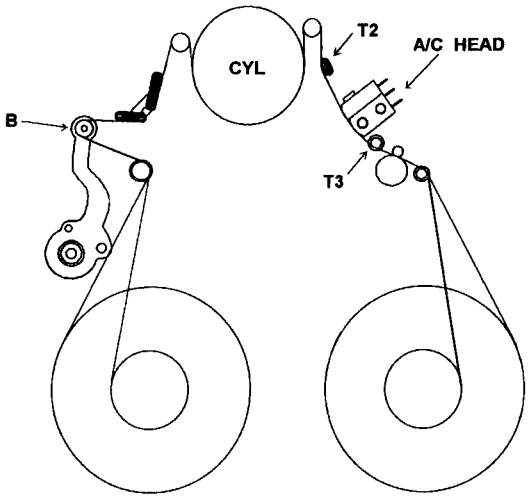
1-19. A/C Head Tilt Confirmation

Specification	A/Amax = 0.95 or more
Test Point	TP101 (CUE:H1)
Adjustment	Screw A, G (A/C Head)
Mode	PLAY
Tape	VFM3580KM: NTSC VFM3680KM: PAL
M. EQ.	Oscilloscope
Tool	VFK1178、VFK1148 (Hex Wrench) VFK1209 (Torque Driver)

1. Playback the alignment tape CUE audio 6 kHz portion.
2. Confirm that screw G and H are tighten.
3. Connect a scope to TP101 and move the tension arm to B direction until T2 post is not moved, then confirm the output level variation is in the specification.
4. If it is not loosen screw G and adjust screw A then tighten screw G with 0.10 N · m (1.0Kgf · cm) torque.
5. It is necessary to complete the adjustment with screw A tighten and confirm that screw A is not loosen.
6. If this is adjusted confirm the Play Limit Confirmation (PLAY).



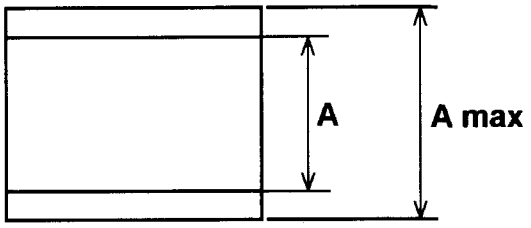


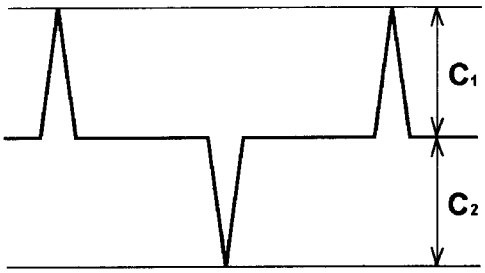


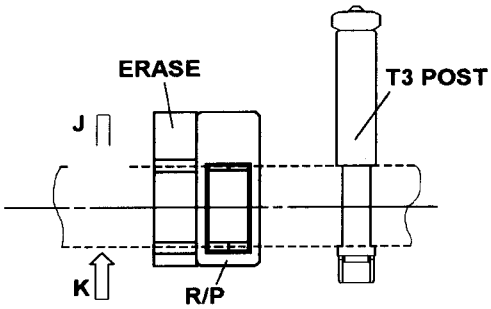
1-20. A/C Head Height Confirmation

Specification	A=0.95 X Amax or more C1, C2 = 1.8V or more
Test Point	TP101 CUE AUDIO(CUE:H1) TP30 CTL(SERVO:F1)
Adjustment	Screw B, H (A/C Head)
Mode	PLAY
Tape	VFM3580KM: NTSC VFM3680KM: PAL
M. EQ.	Oscilloscope
Tool	VFK1150, VFK1190(Hex Wrench)

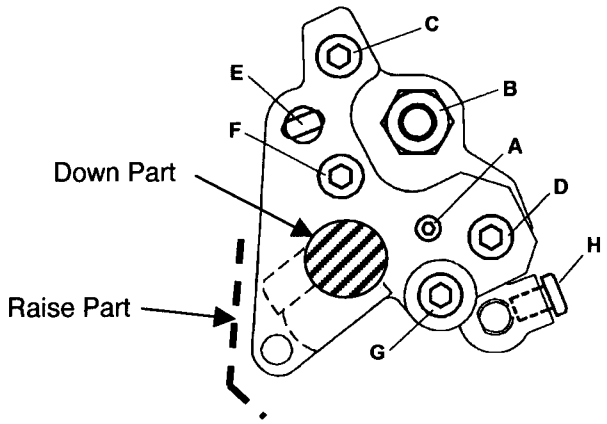
1. Playback the alignment tape CUE audio 6 kHz portion.
2. Connect a scope to TP101 and raise the A/C head or push down it to confirm the CTL level is not increased.
3. If it is increased, slightly adjust the "A/C Head Height Adjustment" and confirm the CTL level is correct.
4. If A/C Head Height is changed the azimuth is changed also. Therefore A/C Head azimuth must be adjusted and confirm alternately.
5. When A/C Head Height is fixed, tilt is changed by tightening screw H and the height is changed. Therefore Height confirmation must be done after tightening screw H.







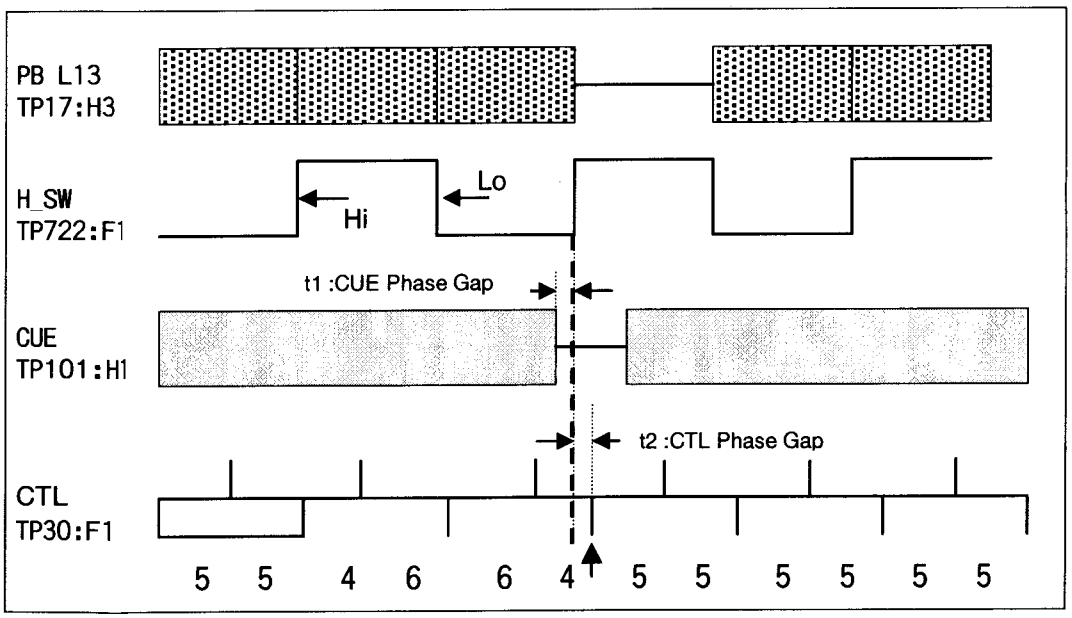
A/C HEAD HEIGHT

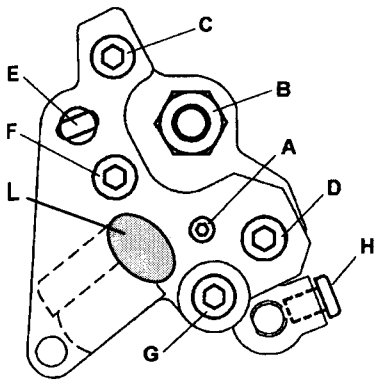


1-21. A/C Head Azimuth and Horizontal Position Adjustment

Specification	50Mmode -125us≦t1、t2≦+125us	**Test Point**	TP17 PB L13 ENV TP722 PB L13 HSW TP101 CUE AUDIO (CUE:H1) TP30 CTL (SERVO:F1)
Adjustment	A/C Head	**M. EQ.**	Oscilloscope
Mode	Playback	**Tool**	VFK0357 (Eccentric Driver) VFK1209 (Torque Driver)
Tape	VFM3582KM (A/C Head H. Position): NTSC VFM3682KM(A/C Head H. Position): PAL		

1. Set the VTR in Service Mode to open the service menu and select the item of "A05 PB L13 LINER" in the "SERVO ADJUST" Menu.
2. Playback an Alignment Tape (A/C Head H. Position).
3. Adjust Azimuth so that the CTL and CUE drop portion is match (Refer to Azimuth Adjustment).
4. Connect a scope CH1 to TP17 on H3 board and CH2 to TP722 on F1 board. Then find the R/P ENV lack portion, and remember the H_SW is High or Low at the portion. (H_SW High or Low is changed at each tape loading.)
5. Adjust A/C Head Horizontal Position so that the memorized H_SW and CTL trigger at the frame start is matched. The frame start CTL is located at the falling edge between 6:4 and 5:5 portion. To adjust the Horizontal position loosen screw C and D then adjust horizontal position by eccentric driver at hole E.
6. After adjustment, tighten the screws with 0.26N · m (2.5kgf · cm) torque and hit gently at L portion to remove the mechanical distortion. Confirm the above specification.





1-22. REV Confirmation and Adjustment (T4HeightAdjustment)

Specification	C1、C2≧Cp1、Cp2×0.75 Lower Limit at T3Post in REV	**Tape**	VFM3580KM: NTSC VFM3680KM: PAL
Test Point	TP30 (SERVO:F1)	**M. EQ.**	Oscilloscope
Adjustment	T4 Post Height	**Tool**	Nut Driver
Mode	REV X 1		

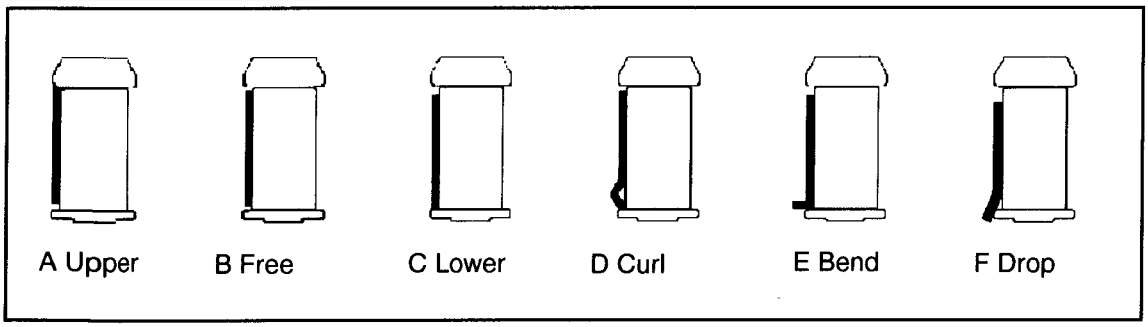
1. Run the Tape in REV x –1 mode, and confirm that the above specification is satisfied. If it is not, adjust the following items.
2. Rotate the T4 nut 45 degrees each and confirm the specification and repeat this adjustment until the specification is satisfied.
3. Specification: CTL level in REV x –1 speed is more than 75 % of Playback CTL level.
   Tape runs in lower limit at T3 Post, and tape has no curling and bending at T3, T4 upper and lower limit.
4. If the Specification is not satisfied, use height adjustment tool.

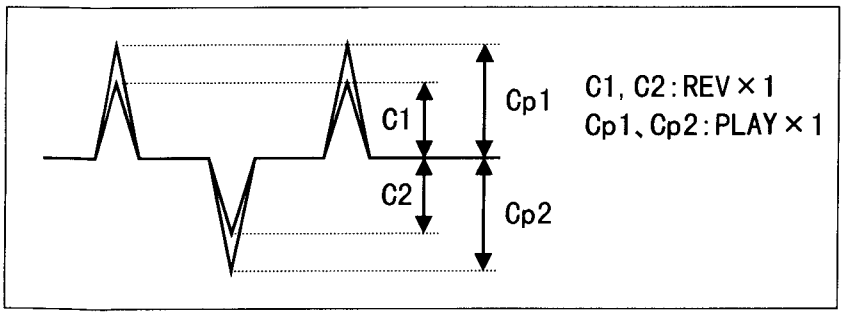
T4 Nut Adjustment Direction

T4 Nut Adjustment Direction	REV CTL Output	REV T3 Post Lower Limit
CW	Increase	More
CCW	Decrease	Less

Post Limit

Post	Tape Limit					
	A	B	C	D	E	F
T3Post	NG	NG	OK	NG	NG	NG
T4Post	OK	OK	OK	NG	NG	NG





1-23. CTL PLAY Output Level Confirmation

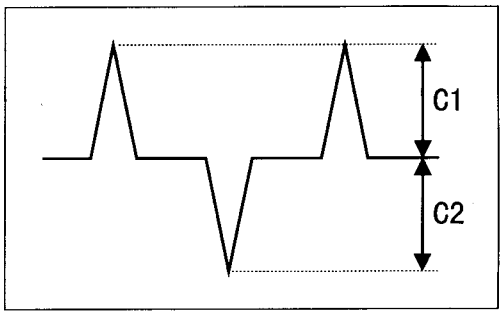
Specification	Refer to Figure
Test Point	TP30 (SERVO:F1)
Mode	PLAY
Tape	VFM3580KM: NTSC VFM3680KM: PAL
M. EQ.	Oscilloscope

A/C Head must be fixed.

1. Set the VTR to 25M Mode, and playback an Alignment Tape. Then observe the CTL.
2. The CTL level is in the specifications in the following table.

CTL Output Level C1,C2		
PLAY	REV × 1	REV × 0.2
C1,C2≧1.8V	C1,C2≧1.4V	C1,C2≧1.2V

1. If the PLAY Output Level is NG. Then confirm the A/C Head Height.
2. If the REV Output Level is NG. Then confirm the T4 Post Height.

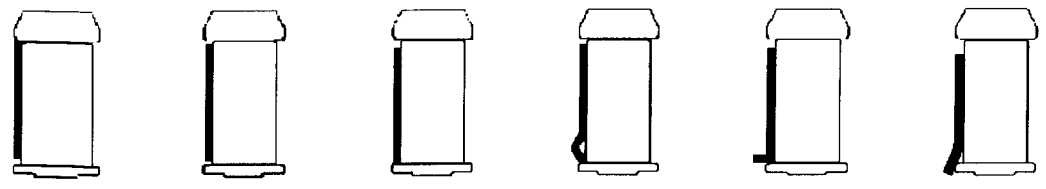


1-24. PLAY Mode Limit Confirmation

Specification	Confirm the each Post Limit is in the following table.
Mode	PLAY
Tape	M Cassette (MP Tape) Tape begin / Tape end

Post	Tape Limit (Refer to Figure)						Adjustment Point	
	A	B	C	D	E	F		
S5 Post	NG	OK	OK	NG	NG	NG	S4, S5Post	Post Height Pre-Adj.
(S4) Tension Post	NG	NG	OK	NG	NG	NG		
S1 Post	OK	NG	NG	NG	NG	NG	S1Post	Envelope waveform Adj.
T1 Post	OK	NG	NG	NG	NG	NG	T1Post	Envelope waveform Adj.
T3 Post	NG	NG	OK	NG	NG	NG	A/C Head Tilt	A/C Head Tilt Adj.
T4 Post	NG	OK	OK	NG	NG	NG	T4 Post	Post Height Pre-Adj.

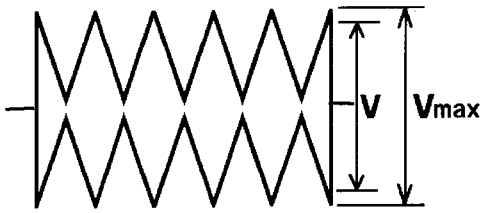
1. Playback a Tape, and confirm the tape limit at each post is as shown in the above table.
2. If it is not adjust each item according with the Adjustment Point in the above table.



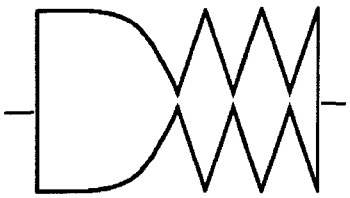
1-25. REV/REW/FF Envelope Confirmation

Specification	Refer to Figure
Test Point	TP17 PB 13 ENV (RFEQ:H3)
Mode	REV, REW, FF
Tape	VFM3580KM: NTSC VFM3680KM: PAL
M. EQ.	Oscilloscope

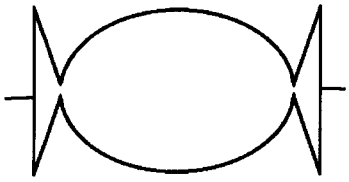
1. Place the VTR in REV, REW, FF and confirm that the Waveform is the same diamond style.
2. Peak level V is always in the following specification.
   V/Vmax ≧ 0.9
3. If it is not confirm the S4 Post Height.



OK



NG

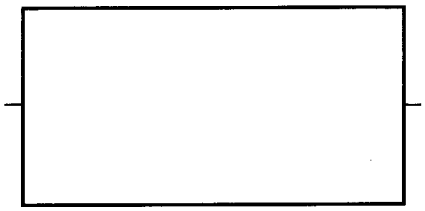


1-26. Envelope Confirmation

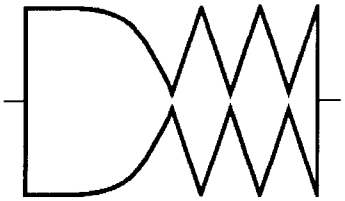
Test Point	TP17 PB 13 ENV
Mode	REW/REV to PLAY Loading completion to PLAY FF to PLAY
Tape	L cassette (123 min pre-recorded) Tape begin
M. EQ.	Oscilloscope

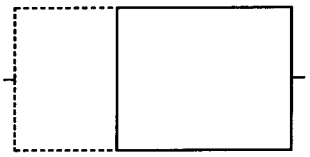
This Adjustment must be done after " Envelope waveform Adjustment".

1. Confirm that the envelope waveform becomes stable immediately in the following transition mode, REW to PLAY, REV to PLAY, FF to PLAY, Loading completion to PLAY.
2. If it is not, confirm S4 Post Height.



OK





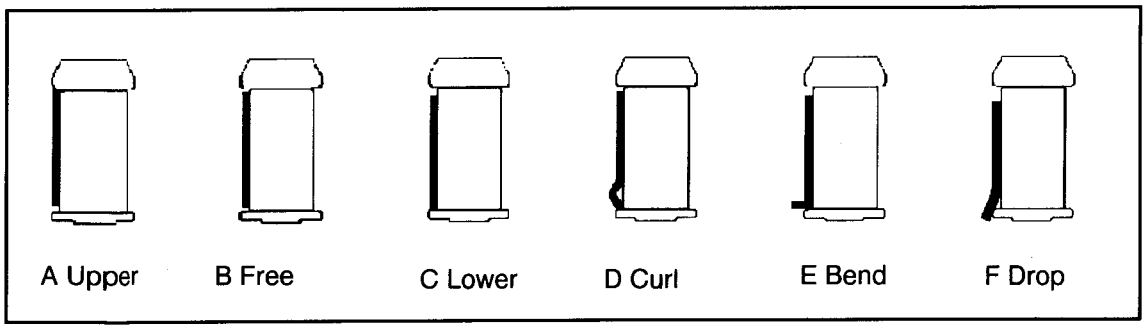
NG

1-27. REV Limit Confirmation

Specification	Confirm the Post Limit is as shown in the following table.
Mode	REV
Work Tape	M Cassette (MP Tape) Tape begin and Tape end

Post	Tape Limit (Refer to Figure)					
	A	B	C	D	E	F
S5 Post	OK	OK	OK	NG	NG	NG
Tension Post	NG	OK	OK	NG	NG	NG
S1 Post	OK	NG	NG	NG	NG	NG
T1 Post	OK	OK	OK	NG	NG	NG
T3 Post	NG	NG	OK	NG	NG	NG
T4 Post	NG	NG	OK	NG	NG	NG

1. Run a tape in Reverse mode and confirm that the tape limit is as shown in the above table.
2.This confirmation is done after each adjustment.

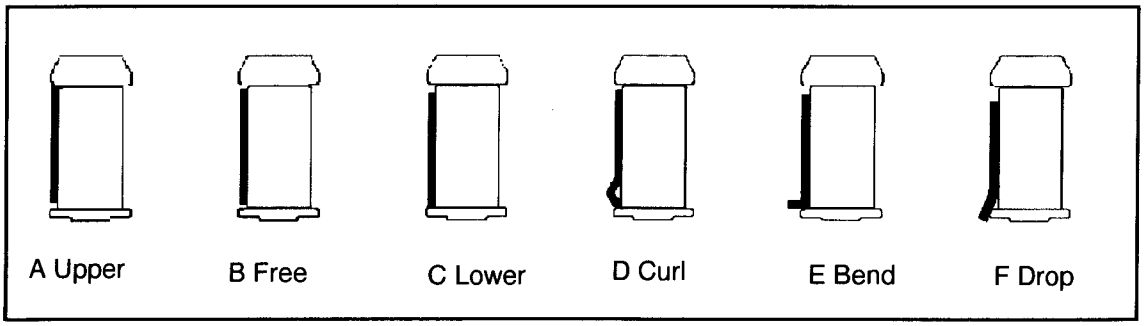


1-28. FF, REW Limit Confirmation

Specification	Confirm the Post Limit is as shown in the following table.
Mode	FF, REW
Work Tape	M Cassette (MP Tape) Tape begin and Tape end

Post	Tape Limit (Refer to Figure)					
	A	B	C	D	E	F
S5 Post	OK	OK	OK	NG	NG	NG
Tension Post	NG	OK	OK	NG	NG	NG
S1 Post	OK	NG	NG	NG	NG	NG
T1 Post	OK	OK	OK	NG	NG	NG
T3 Post	OK	OK	OK	NG	NG	NG
T4 Post	OK	OK	OK	NG	NG	NG

1. Run a tape in FF, REW mode and confirm that the tape limit is as shown in the above table.
2. This confirmation is done after each adjustment.

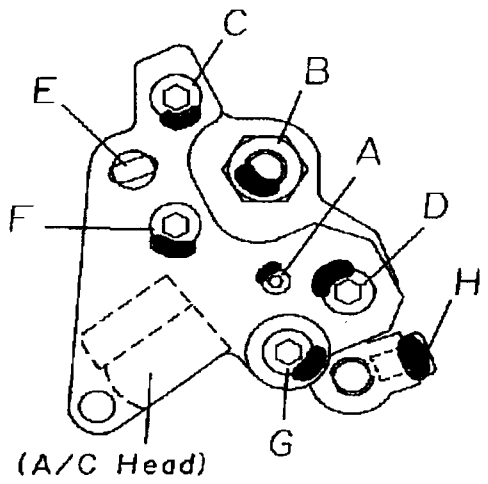


1-29. A/C Head and T3, T4 Post Screw Grew

[A/C Head Screw Grew]

	Screw A	Other Screw
Grew amount	About 3 mm	About 5 mm

1. Grew after A/C Head Adjustment.
2. Remove the screw grew before Adjustment.

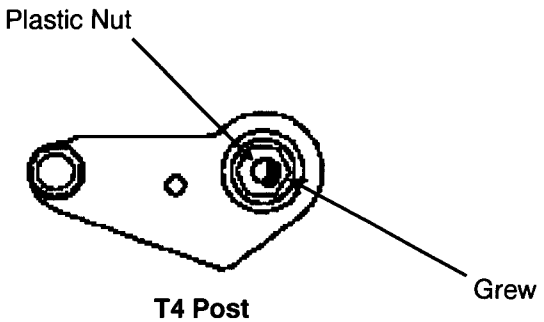


[T3 Post, T4 Post Grew]

	T3 Post	T4 Post
Grew amount	About 3 mm	About 3 mm

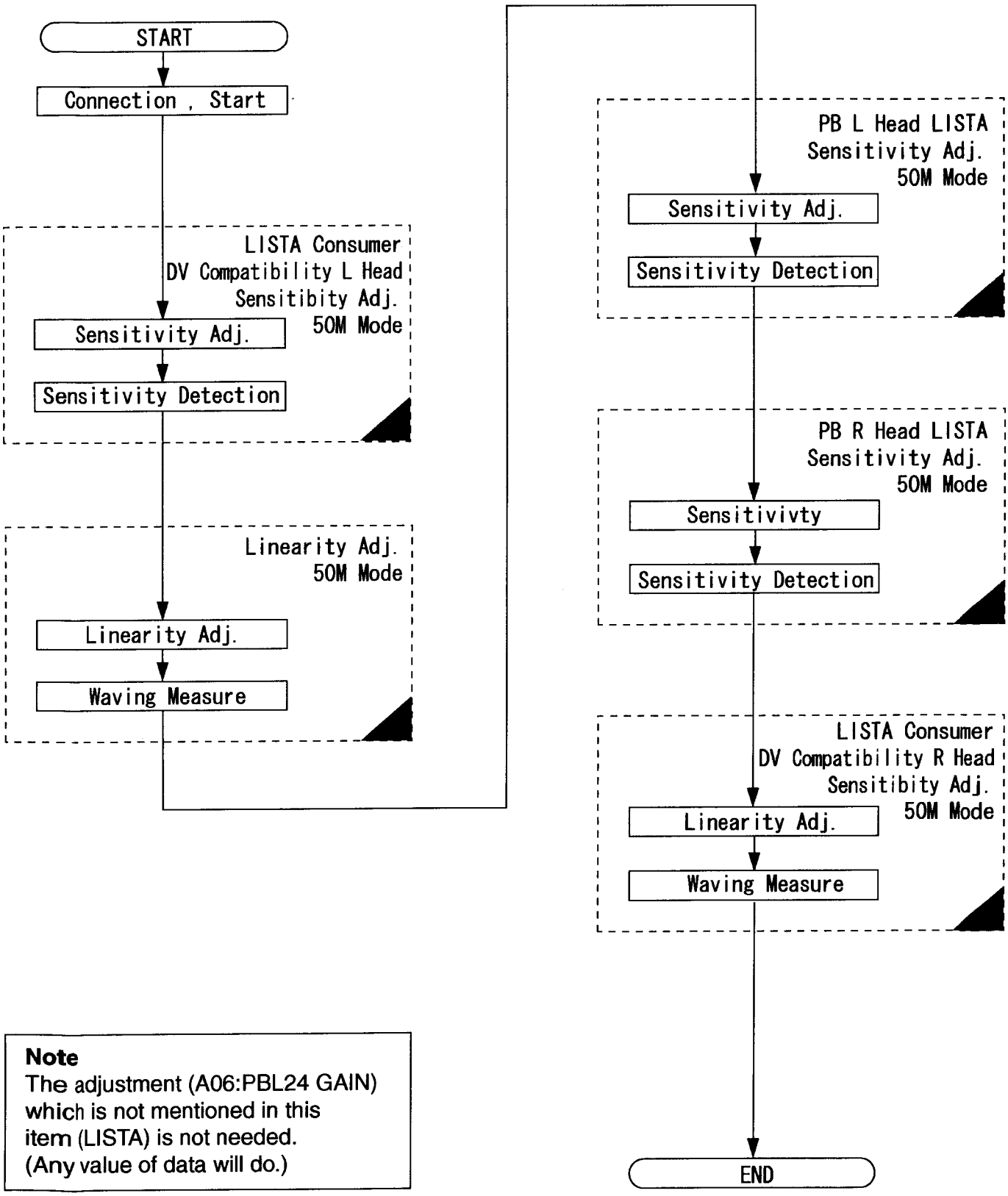
1.After A/C Head Adjustment, grew the Plastic Nut part of T3 and T4 posts.

2. Remove the screw grew before Adjustment.



1-30. LISTA

LISTA Process

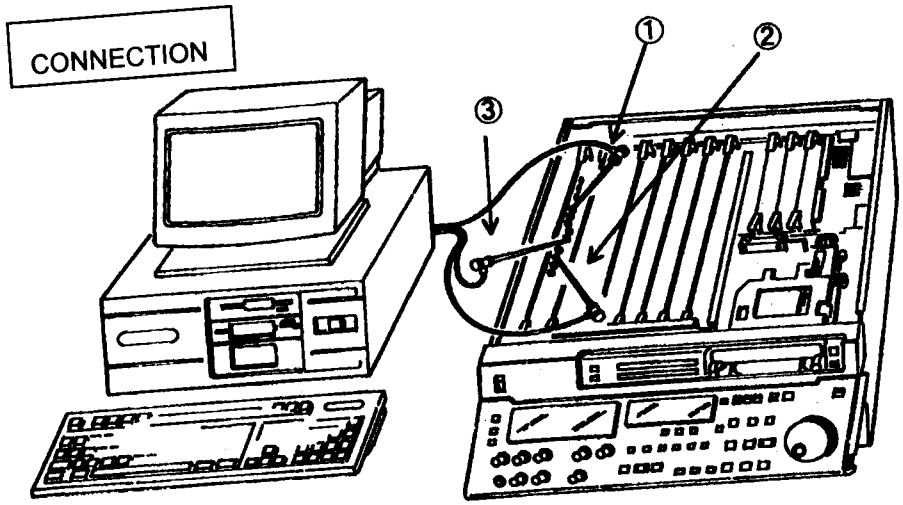


Note
The adjustment (A06:PBL24 GAIN) which is not mentioned in this item (LISTA) is not needed.
(Any value of data will do.)

1-31. LISTA Connection and Start

Test Point	TP732 ATF ERR L(SERVO:F1) TP734 ATF ERR R(SERVO:F1) TP722 PB HSW L13(SERVO:F1) TP724 PB HSW R13(SERVO:F1) TP901 DV HSW R12 (SERVO:F1) TP902 DV HSW L12 (SERVO:F1) TG510 GND (SERVO:F1)
M. EQ.	PC (AD Board must be installed.), Oscilloscope
Tape	NTSC: VFM3580KM (ENV LEVEL), VFM3581KM (LISTA) PAL: VFM3680KM (ENV LEVEL), VFM3681KM (LISTA) VFM3000EDS
Tool	VFK1481 (LISTA Software), VFK1186(LISTA Cable)

1. Connect the LISTA cable with the A/D board in the PC.
2. Connect the LISTA clips to the following Test Points.
   (1) ATF:TP732 (F1) or TP734(F1)
   (2) HSW:TP722(PB HSW L13), TP724(PB HSW R13), TP901(DV HSW R12), or TP902(DV HSW L12)
   (3) GND:TG510



3. Run the LISTA software.

Installation and Operation

Make a directory like C:LISTA and copy the all files in the floppy disk of VFK1481.

Type Lista.exe in the DOS mode to run the LISTA software.

4. Select the model of AJ-D950 in the menu.
5. Select a alignment tape to use LISTA Adjustment. If it is not displayed choose one of the listed tape and type Y ((Y)es or (N)o) and resist the data which is supplied with the alignment tape.

1-32. Alignment Tape Data Registration

1. Select <4> Alignment Tape in the LISTA software main menu.
2. Select <2> ENTRY in the Alignment Tape Menu.
3. When << Alignment tape Data Entry >> is displayed, input the tape serial number according with the menu instruction. The serial number is stumped on the alignment tape. Then select the PAL or NTSC. Type 0 or ENTER to choose DVCPRO.
4. Then input the all data (37 items for NTSC) and check sum. IF the data is incorrect registration is not completed so check and input again.

After data registration select <1> SELECT.

1-33. LISTA Consumer DV Compatibility L Head Sensitivity Adjustment (50M Mode)

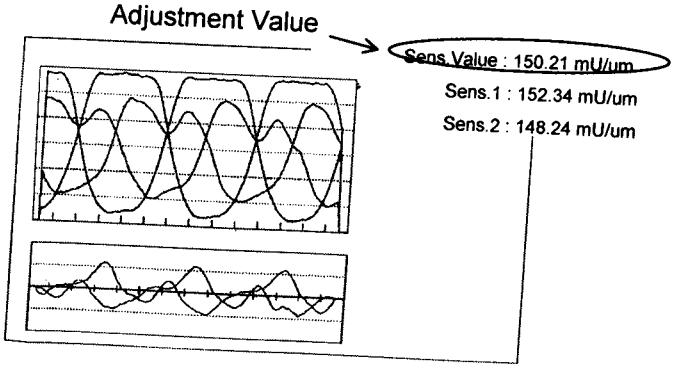
Specification	Sensitivity 150 ± 15 (mV/μm)
Mode	Servo Adjustment Menu: "A10: DV L GAIN"
Test Point	TP732: ATF ERR L (Servo Board: F1) TP902: DV HSW L12 (Servo Board: F1) TP510: GND (Servo Board: F1)
Adjustment	LISTA Set
Tape	(VFM3581KM or VFM3581KL) for NTSC, (VFM3681KM or VFM3681KL) for PAL

Before this Adjustment adjust RFEQ (H3/H4) ENV Level Adjustment (L/R).

Set the LISTA software in 25M Mode. Select AJ-D950 in the PC menu and displays the main menu. 25M and 50m mode can be changed by "0" key.

1. Select "A10: DV L GAIN" of the Servo Adjustment menu.
2. Select "(4) LISTA Alignment Tape" of LISTA menu and Select the "NTSC or PAL" number of DV tape number which is used for adjustment.

   Note: Please be careful select the "NTSC" or "PAL" on the above menu, which is follow the VTR.
3. Playback the consumer DV LISTA master Tape.
4. Select the "(6) ATF Error Signal Monitor" and display the sensitivity data.
5. When the sensitivity data is displayed, adjust ATF Gain so that the sensitivity value at the upper-left on the monitor is in the specification.
6. ATF Gain is adjusted by rotating the JOG Dial while pressing the JOG/SHTL key.
7. After completion of adjustment, press ESC key to return menu and select (1) sensitivity Measurement.
8. Confirm the sensitivity value is in the specification.

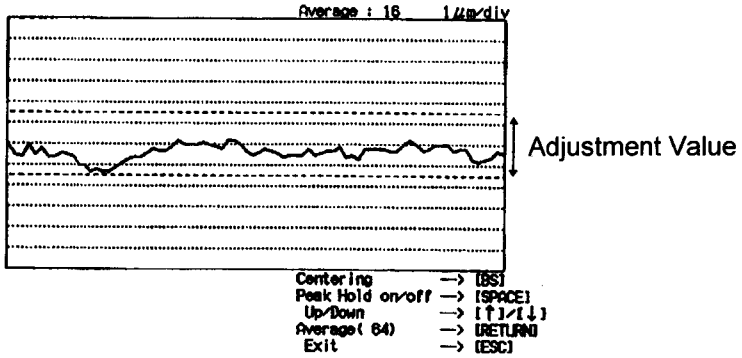


1-34. LISTA Linearity Confirmation and Waving Measurement (50M Mode)

Specification	Linearity is less than 3 μ m, Waving is less than 1.5 μ m.
Mode	SERVO Adjustment Menu:"A11: DV L LINER"
Test Point	(1) ATF:TP732 (2) HSW:TP902 (DV HSW L12) (3) GND:TG510
Adjustment	S1 and T1 Post Height
Tape	NTSC: VFM3581KM (L) PAL: VFM3681KK (L)

1. Open the Service Menu and select "A11: DV L LINER" in the "SERVO ADJUST"
2. Playback a LISTA alignment Tape (VFM3581KM).
3. Select "(2) Linearity Measurement" then Linearity waveform is appeared.
4. When the following waveform is appeared press "BS" (Back Space) key to centering the waveform. Adjust S1 and T1 Post Height so that the Linearity waveform is flat. Confirm the ENV waveform is flat.

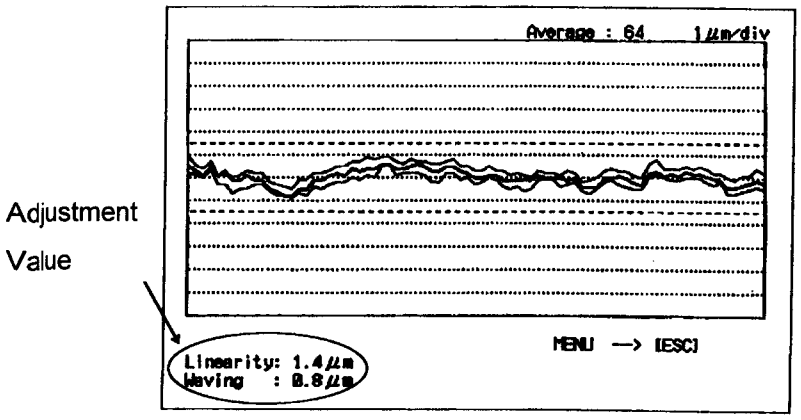
Red dot lines shows the specification, so linearity waveform should be in the lines.



After the Linearity Adjustment measure the waving.

Waving Measurement

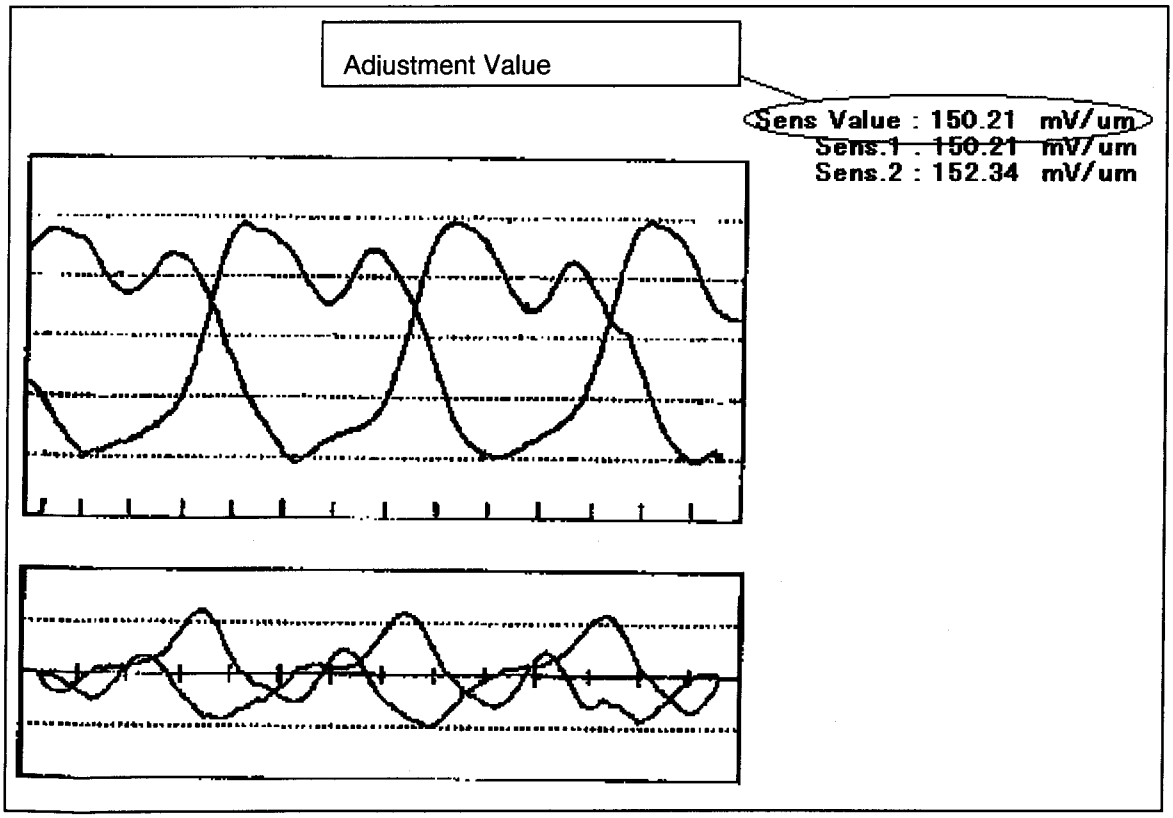
1. While the linearity is displayed on the monitor press "SPACE" key to hold the Peak (30 seconds).
2. Press "SHIFT" and "}" keys together and "Waving" value is displayed at left bottom of the monitor. Then confirm the waving is 1.5 um or less, and the waving is constant from the entrance to exit. If the waving is out of specification adjust S1 (Entrance) and T1 (Exit) Post Height.
3. After measurement press ESC key to return the main menu.



1-35. PB L Head LISTA Adjustment (50M Mode)

Specification	Sensitivity 100 ± 10 (mV/ μ m)
Mode	SERVO Adjustment Menu: "A04: PB L13 GAIN"
Test Point	(1) ATF:TP732 (2) HSW:TP722(PB HSW) (not TP724(PB HSW) (3) GND:TG510
Adjustment	SERVO Adjustment Menu: "A04: PB L13 GAIN"
Tape	VFM3581KM(L): NTSC VFM3681KM(L): PAL

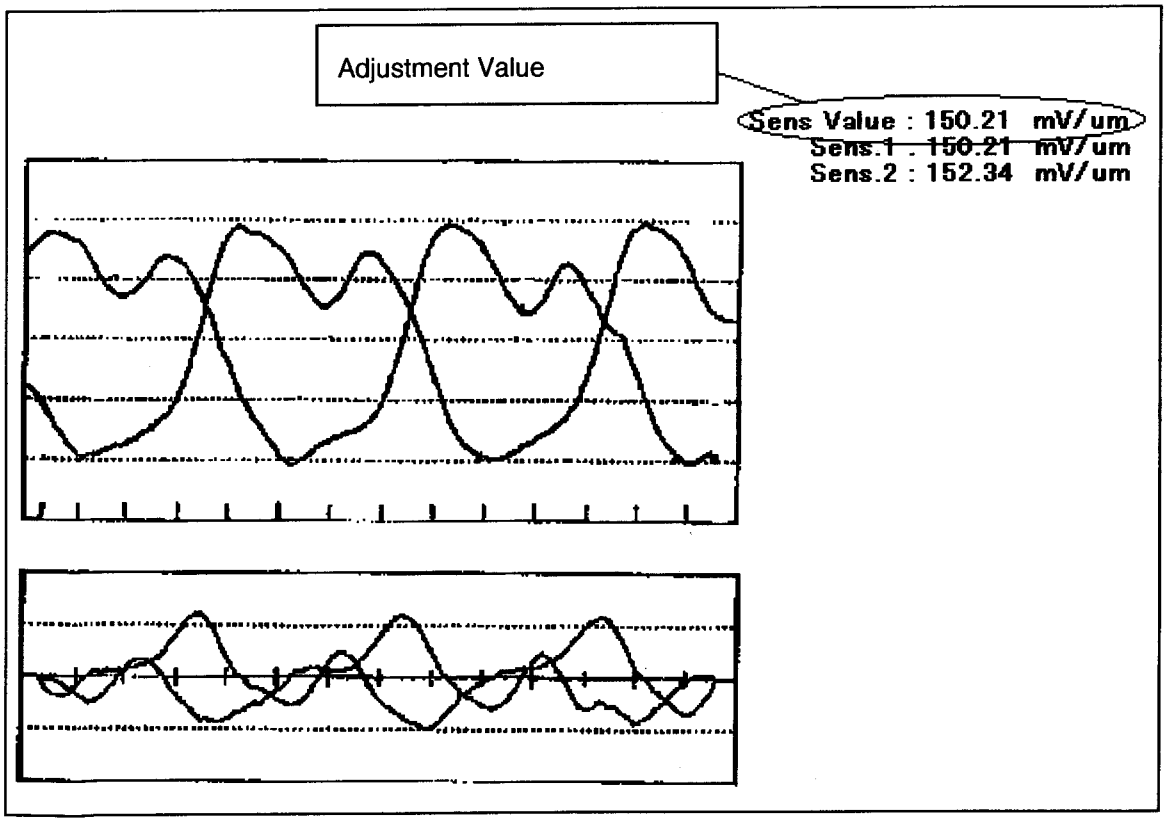
1. Open the SET-UP Menu and set #012: 50M #013: MANUAL.
2. Set the VTR in Service Mode to open the service menu and select the item of "A04: PB L13 GAIN" in the "SERVO ADJUST" menu.
3. Playback a LISTA alignment tape.
4. Select the LISTA (6) ATF Error Signal Monitor and type Enter to start the software.
5. When the picture is appeared as shown in figure adjust ATF Gain so that the "Sens. Value:" is in the Specification. Press ESC key to return menu and select (1) sensitivity Measurement.
6. Confirm the sensitivity value is the specification.



1-36. PB R Head LISTA Sensitivity Adjustment (50M Mode)

Specification	Sensitivity 150 ± 15 (mV/um)
Mode	SERVO Adjustment Menu "A08: PB R13 GAIN"
Test Point	(1) ATF:TP734 (2) HSW:TP724(PB HSW) (not TP722(PB HSW) (3) GND:TG510
Adjustment	SERVO Adjustment Menu: "A08: PB R13 GAIN"
Tape	VFM3581KM(L): NTSC VFM3681KM(L): PAL

1. Open the Service Menu and select "A08: PB R13 GAIN" in the "SERVO ADJUST" menu.
2. Playback a LISTA alignment Tape.
3. Select LISTA Main Menu "(6) ATF Error Signal Monitor" and type Enter to start the software.
4. When the picture is appeared as shown in figure adjust ATF Gain so that the "Sens. Value:" is in the Specification.
5. Press ESC key to return menu and select (1) sensitivity Measurement.
6. Confirm the sensitivity value is in the specification.



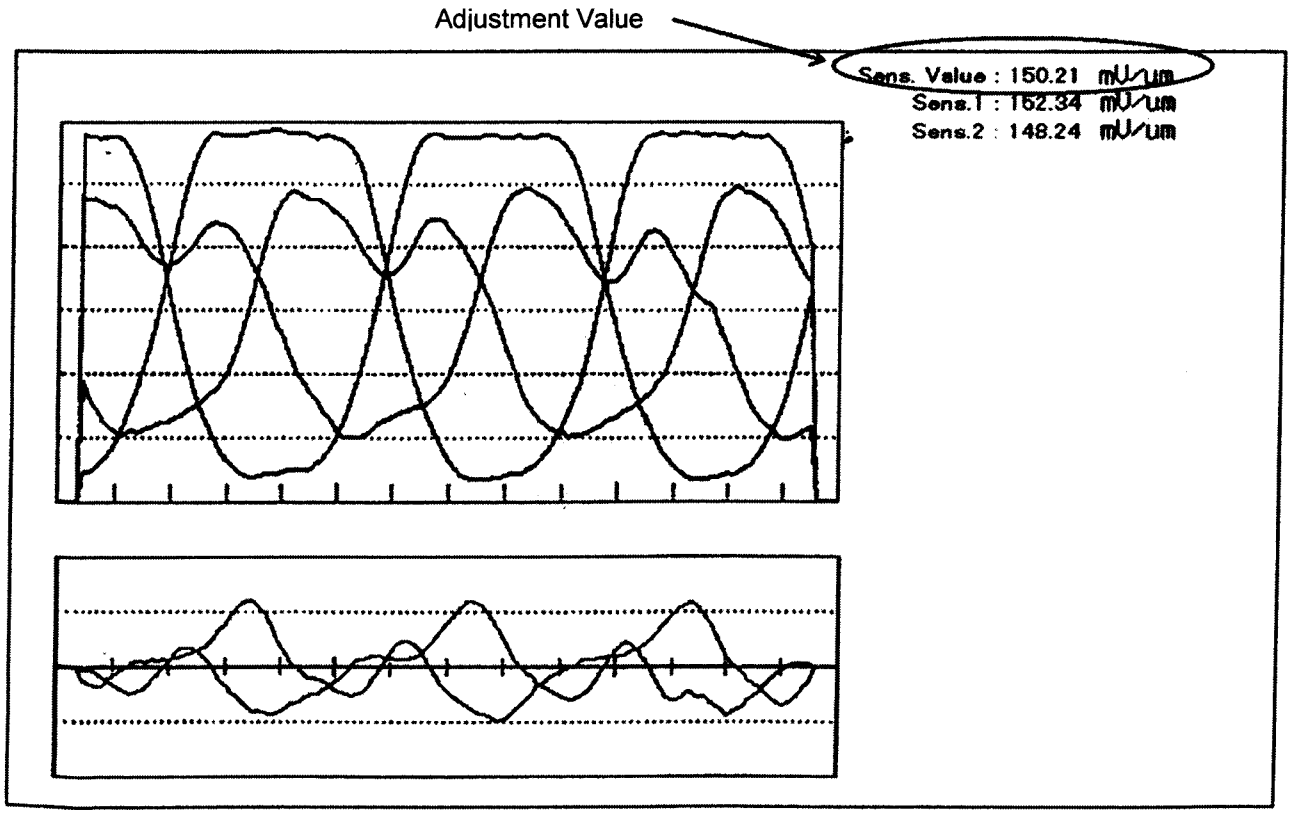
1-37. LISTA Consumer DV Compatibility R Head Sensitivity Adjustment (50M Mode)

Specification	Sensitivity 200 ± 20 (mV/μm)
Mode	Servo Adjustment Menu: "A12: DV R GAIN"
Test Point	TP734: ATF ERR R (Servo Board: F1) TP901: DV HSW R12 (Servo Board: F1) TG510: GND (Servo Board: F1)
Adjustment	LISTA Set
Tape	VFM3000EDS (LISTA Master Tape for consumer DV)

1. Select "A12: DV R GAIN" of the Servo Adjustment menu.
2. Select "(4) LISTA Alignment Tape" of LISTA menu and Select the "NTSC or PAL" number of DV tape number which is used for adjustment.

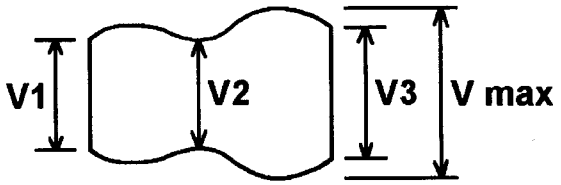
   Note: The Alignment tape (VFM3000EDS) is common use NTSC and PAL.

   Please be careful select the "NTSC" or "PAL" on the above menu, which is follow the VTR.
3. Playback the consumer DV LISTA master Tape.
4. Select the "(6) ATF Error Signal Monitor" and display the sensitivity data.
5. When the sensitivity data is displayed, adjust ATF Gain so that the sensitivity value at the upper-left on the monitor is in the specification.
6. ATF Gain is adjusted by rotating the JOG Dial while pressing the JOG/SHTL key.
7. After completion of adjustment, press ESC key to return menu and select (1) sensitivity Measurement.
8. Confirm the sensitivity value is in the specification.



1-38. PLAY Envelope Confirmation

Specification	V1/Vmax, V3/Vmax≧0. 7, V2/Vmax≧0. 8
Test Point	TP17:PB ENV L13(H3) :PB ENV R13(H4) :DV ENV L12(H2) TP19:PB ENV L24(H3) :PB ENV R24(H4) :DV ENV R12(H2)
Adjustment	S1,T1PostHeight
Mode	Servo Adjustment Menu: "A14: ENV SEL 25M"
Tape	VFM3580KM(L): NTSC VFM3680KM(L): PAL
M. EQ.	Oscilloscope
Tool	VFK1149 (Post Driver-)



1. Open the Service Menu and select "A14: ENV SEL 25M" in the "SERVO ADJUST" menu.
2. Playback an alignment Tape.
3. Confirm the every Head Envelope Level is in the specification.
4. If it is not adjust ENV waveform Adjustment and LISTA Adjustment.

3-4. PG SHIFTER Adjustment

C.B.A.	SERVO (F1)
TP	TP722(PB L 13 HSW), TP729(SPA REC)
ADJ.	-
TAPE	VFM3580KM
INPUT	-
MODE	PLAY
M. EQ	Monitor, Oscilloscope
SPEC.	t1, t2 = 126.8μs ± 2μs

1. Set DIP switch pin **SW1-1** located behind the front panel to the ON position.
2. Turn power to the main unit ON.
3. Press the MENU switch located on the sub-panel under the front panel to display the Service Menu.
4. Select ***A3: PG SHIFT***.
5. Playback the Alignment tape.
6. Press the SEARCH button and keep it until the number which is displayed at right of ***PG SHIFT*** irenewed.
7. Connect a scope to TP722 and TP729.
8. Confirm the t1 and t2 so that the value is in specification.
9. Close the Service Menu.